FOOD INDUSTRIES

manufacturing and processing

A McGRAW-HILL PUBLICATION—ESTABLISHED 1928

H. C. PARMELEE, *Editor*

New York, August, 1930

VOLUME 2 . . . NUMBER 8

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Where Do We Go From Here?

► Success of corporations, as of men, in times of stress and difficulty is closely tied up with the possession of something distinctive—something that cannot be easily or quickly purchased or replaced in the open market for so many dollars and cents. For the man it may be energy, resourcefulness, or imagination; for the corporation it may be a distinctive product, a smoothly efficient distribution system, an unimpeachable reputation for quality, or a remarkably well-equipped plant that is able to produce at costs below the level of those of competitors.

► Whenever a concern lacks some phase or this highly desirable quality of individuality or distinction, then that concern is in a position that is commercially precarious when bad times come. Only the most superior managerial ability could make it show a profit. But superior management is careful not to let itself get into that kind of a predicament.

► The big question now is, where do we go from here?—or even, how do we go from here? What has been learned from the vicissitudes of the past half year that will help us out of the doldrums? What can be done to put plants and businesses in a position as nearly shockproof as is humanly possible?

► Certainly, now is the time to clear the mind of the cobwebs of stagnation and self-satisfaction and to replace the obsolete equipment in the plant. Get out of the rut of doing things in the same old way. Bring in new ideas, new methods, new equipment. Study distribution. Adopt a plan that will put the whole business in possession of something so distinctive—so individually yours—that every Tom, Dick, or Harry who happens to have $20,000 in cash or credit cannot duplicate it and cut deeply into sales.

► If a business involves no more individuality or possesses no more of the results of creative genius than any one can buy for money from a multitude of sources, then it is high time for its owners to lie awake nights to look for "the priceless ingredient." The best equipment available, plus the best specialized creations from the company organization, is one very important way in which to attain the highly desired individuality and commercial distinction. Now is the time for positive and aggressive resolutions with a far-reaching purpose in mind.

EDITORIALS

AUGUST, 1930

Place Responsibility Where It Belongs

THE PINCH of economic stress has led several concerns in the food field to curtail what should be one of the fundamental activities of any manufacturing company. According to some of the letters we have received, research departments have been thrown overboard!

If such a department is worthy of the name, this action is equivalent to throwing away a good part of the creative brains of the organization. Such a course may bring temporary financial relief, but would seem to indicate lack of long-range planning. When a corporation turns out its whole research organization, to find other jobs where they may, it is virtually saying to the business world that it has no knowledge worth keeping. Strangely enough, one concern which has refused to grant any publicity concerning its manufacturing operations has allowed the men who created nearly all its products to "resign." All of the technical knowledge gained through years of hard work, heretofore so jealously guarded, is dissipated—lost.

But on the age-old principle that "to know all is to forgive all," let us consider other aspects of the picture. By "research" we mean all sorts of investigations that pry into the unknown area surrounding any business. It is a tool that not every executive knows how to use. Only when this tool is used properly by one who knows how, will the results be satisfactory, or will it justify its cost.

If the department fails to show a profit, where does the blame really lie? Perhaps management or the system of cost accounting more often than the work of the department itself is at fault. Projects for research should be based on sound economics. If investigations are pursued that cannot be ultimately turned to good account, and make greater profits for the stockholders, then naturally the department will be tossed overboard in the first storm, even though the research workers have not been responsible for determining the subject and scope of the unprofitable investigation.

Only after a thorough determination of the economics of a problem has indicated that there is a sound basis for the work, should the research department be allowed to go ahead, pursuing the investigation wherever it may lead, with the satisfaction of knowing that the project ultimately will result in good for the stockholders.

Manufacturers sometimes wonder why classic researches are carried on by some of their successful contemporaries—excursions into abstract science that seem to the casual observer to be leagues removed from any practical applications. Close investigation, however, will show that all such researches fit into an economic pattern that is fundamentally sound. When the studies are completed, the management has new facts that sooner or later, are convertible into dollars.

Do you blame the accelerator of your car if your foot presses heavily on it and you steer in the wrong direction? Then do not blame research as a principle if it does not lead your company anywhere. After all, research is only accelerated experience, and no matter how rapid and trouble-free the acceleration may be, it cannot bring an organization to a position of increased profit without a predetermined road map and a firm hand on the steering wheel.

Harvey W. Wiley

WITH the passing of Dr. Harvey W. Wiley we have witnessed the close of the life of a historic character whose influence upon the lives of every person in this country is greater and more enduring than that of any other person we can now name. Although he is generally regarded as the father of the pure food laws of the country, his life and work are to be evaluated in broader terms.

It was inevitable that a champion of pure food would some time arise who could not be downed. The movement for reform was afoot long before Dr. Wiley, as chief chemist of the Department of Agriculture, was successful in his endeavors to procure the enactment of the Food and Drugs Act of 1906. Those with long memories may recall that a similar law was vigorously proposed by a young Congressman a few years earlier, but that it was defeated by the simple expedient of appointing its proponent to the judiciary. But in time Dr. Wiley was successful in securing the reforms for which he fought so vigorously. The incidents that followed need not be recounted here. The principle for which he fought was that public welfare must govern in all matters affecting foods, beverages, and drugs.

But it is apparent, at the present time, that a complete understanding of the fundamental principles underlying food preservation and food manufacture came to the industry only after the Food and Drugs Act compelled it to study and to know them. One of the first firms to emerge from the confusion into which the industry was thrown by the law soon produced a non-preservative catsup that would keep, and capitalized that fact with the superb ability for which its founder was famous. In order to compete with it, other companies were forced to learn the fundamentals of the simple methods of pasteurization that are known to nearly every catsup maker today. The movement for research in preservation spread rapidly in all directions and to every branch of food production, and subsequent rulings of the Bureau of Chemistry added further stimulus to investigation.

Just as many historical characters and events are frequently held in popular esteem for the spectacular, so

will Dr. Wiley be popularly known as the father of the pure-food movement; but his life has a deeper significance. Just as Newton's discovery of the laws of gravitation are the popular basis of his fame, although his invention of calculus is regarded by many scholars as a far more important discovery, so will Wiley be known best for his battles for purity of foods and truth in labeling. But he was the instrument providing the force that compelled the food industries to take up chemistry and bacteriology. For this reason the food-manufacturing fraternity should remember him, not as a punitive force but as an unconsciously creative one.

Group Advertising in the Balance

TO CONVINCE a man that he needs two automobiles or two toothbrushes undoubtedly is possible; his pocketbook may be the only limitation to the resultant increase in sales. But it does not follow that he can be persuaded into eating two hearty dinners in place of one.

The fundamental limitation imposed upon consumption by the capacity of the human stomach is the knife edge of a balance into which the products of all food manufacturing groups must go. The pans of the balance may rise and fall with shifts in public taste, but in these days of small families and restricted immigration, the total capacity of the balance does not change enough to be noticeable.

The futility of trying to overload the balance is not always apparent. When the weight of concentrated sales effort goes on the pan of an individual industry, the pointer may show a favorable swing. The gain, however, will remain real only until the sales effort is matched or exceeded by an "Eat More ——" appeal in an opposite pan. Then both will swing back to the same old level. The net result may be a vibration of the beam that eliminates the economies of orderly production by its very unsteadiness.

Of course, this does not mean that group advertising must put a strain on the balance. It simply means that public acceptance of an increase in quality of the product, rather than in the quantity of the product, must be the compelling force behind such organized sales effort if it is to be of permanent value. The effort must be to get more worth, rather than more weight, into the pans.

To strive for a pounds-per-capita increase of a certain food only can set the pans in oscillation as industry opposes industry; to strive for a dollars-per-capita increase may be a real benefit for all concerned. There is not much use trying to get a man—much less a woman—to spend money for more food; but there is a world of possibilities in persuading them to pay for better food and for food in which more of the labor of preparation has been transferred from the kitchen to the factory.

Nor is this a brief against the staples. The most radical of epicureans never contended that bread should be replaced by angel cake, or haddock by caviar. But organized effort to convince the public mind that better bread, or better haddock—even better caviar—is worth a few cents more per pound seems well worth while.

After all, the fractions into which the food bill is divided are but subdivisions of the fractions into which a man's total income is divided. Efforts to combat, pound for pound, foodstuffs manufactured by another group at best can only shift the subdivisions. If group advertising, by sponsoring purchases of better foods, attracts some small part of the income that now goes to the other divisions, to gasoline, lipstick, or antiques, its service to all manufacturers—and to the health and pleasure of mankind—will unquestionably be great.

Economic Laws Cannot Be Supplanted

RELIEF for the sugar-beet grower and protection for the beet-sugar industry were promised in glowing terms by the proponents of the Hawley-Smoot tariff. The fact is that, simultaneously with the final enactment of that measure, the price of sugar has gone down instead of up. This performance has led to much speculation and to much political explaining.

Sugar prices in the United States are determined by many factors, only one of which is the tariff. This was a fact well known among those members of the United States Congress who strongly supported the increase in duty. They probably are as little surprised as anyone that sugar has not promptly risen in price in response to the new levies. Nevertheless, it is seemingly still "good politics" to orate on the basis of this type of fallacious economics. Regardless of this and all other laws, the prevailing price for sugar in the United States is largely determined by the prevailing raw sugar price in Cuba. So long as there are surpluses in that island this price will continue low, and the domestic growers of both cane and beets will suffer accordingly.

If the present low price level continues long enough it unquestionably spells ruin for the Western beet grower. The Western sugar manufacturer must of necessity pass on to the beet farmer the effects of low sugar prices. No amount of tinkering with laws of the land, and no attempted suspension of the laws of economics, can prevent these consequences.

The self-appointed friends of agriculture stand again discredited. They have held out false hopes to their constituency. One can only wish that the voters at home could be educated to understand such situations. These voters could then make it unprofitable to practice demagoguery in high places. They would then support real statesmanship instead. The nation, as a whole, could ask no better result.

How a Formula for

DESCRIPTIVE GRADING

Was Developed

Two recognized authorities grading peas

By L. CHARLES MAZZOLA
*General Manager, Geneseo Jam Kitchen, Geneseo, N. Y.**

IN A PREVIOUS article that explained a new method of grading devised to give a minute quantitative description of canned foods (FOOD INDUSTRIES, Vol. 2, p. 214; May, 1930), reference was made to the development of an empirical mathematical formula by which the total description could be expressed in a single evaluation. This study has now progressed far enough to justify its presentation as a possible means of directing the human element that is necessarily a part of grading foods, to the end that identical figures will be a more accurate measure of equivalent quality.

Obviously, the only value in having results expressed in a single figure is to evaluate the foods for a comparative classification. There certainly would be no point in substituting the single evaluation obtained from this method for any other single evaluation now in use. It should be definitely understood that the figure alone tells only a part of the story; it must be considered along with the descriptive data previously referred to if any adequate attempt is made to visualize the contents of the material in question.

In order that the reader may have in his possession the major steps in the evolution of this formula, better to equip him to make suggestions for its improvement, the way in which it was evolved is reported in some detail.

The principle that a quality drop from perfection to less than perfection, when shown mathematically, must include some factor which will take care of the acceleration in the drop, was one of the first requirements to be discovered. Unless this factor be taken into consideration, the relative results that describe quantitatively the value of a quality factor in its various degrees—from perfection to imperfection—obviously will not be a reflection of the facts.

To illustrate—if we take as an example two samples of peas: One sample scores perfect, or 9, in everything but liquor, color, splits, skins, and uniformity of size (see Fig. 3). In each of these qualities it scores 8 when using the descriptive method. This indicates that the liquor, color, etc., are almost perfect, but not quite. Such a pea probably would be graded as "fancy" by most accepted authorities.

The other can of peas scores perfectly in everything but liquor, where it scores 5, showing a little sediment; splits score 8, and skins score 8. In this case, the same graders probably would grade this "extra standard" rather than "fancy," because of the sediment.

If a constant figure be deducted from 100 per cent, as representative of perfection, for each digit less than 9, and if this constant be equal to 2 per cent, the deduction from 100 per cent will be 5x2 per cent in the first example, because there are five 8's. This gives the sample a total score of 90 per cent. In the second case, the first deduction will be for 4x2 per cent, or 8 per cent, on account of the liquor score of 5 — 2 per cent for each unit below 9. An additional 2 per cent will be subtracted for the splits and another 2 per cent for skins, making a total deduction of 12 per cent, giving a score of 88 per cent.

The first sample would be graded "fancy," and the second "extra standard," but while with the foregoing scoring one rates 90 per cent and the other 88 per cent, this is too close to indicate the differentiation. To make this expression of a single evaluation fit accepted prac-

*Formerly of the Research Department, Snider Packing Company, Rochester, N. Y.

GRADING FOODS for quality has long been a method involving subjective tests that usually are incapable of accurate definition. This has been particularly true of grading canned foods, and much of the opposition to the Mapes bill and the proposed Hope bill has been based on the premise that quality grades are not susceptible of legal definition.

Mr. Mazzola has developed a new method of recording quality factors that is a forward step, worthy of careful study by all interested in scoring methods. It appears to permit evaluation of a food in a single figure reflecting the quality of the food under scrutiny. In the hands of a non-expert it gives results in fair agreement with those of experts.

While such a method is seldom necessary in every-day business, it becomes of importance as a referee method. The work as outlined here may not be the ultimate form, but it holds possibilities worthy of further study. If the Mazzola system of grading should prove to be generally useful, its application can no doubt be greatly simplified.—*The Editors.*

tice, the formula must include the constant deduction plus some mathematical progressively accelerated factor that will make possible the elimination of the notations, usually made in score sheets, that any specimen scoring less than some given figures can be only "extra standard" or "standard," as the case may be. It is our intention to have the formula express these results directly.

Considerable mental gymnastics were required to overcome this objection, even to the degree so far accomplished. At the beginning, numerous empirical figures were deducted from 100 per cent to express the constant plus the acceleration factor which each digit in the descriptive grading represented. As an example, this accelerated formula was tried:

For each 9 deduct	0% from 100%
For each 8 deduct	2% from 100%
For each 7 deduct	3% from 100%
For each 6 deduct	5% from 100%
For each 5 deduct	8% from 100%
For each 4 deduct	12% from 100%
For each 3 deduct	18% from 100%

In this method, which was soon discarded, the various figures chosen empirically did not seem adequately to ex-

Table I—Effect of Using the Value Y=½ per cent in the Grading Formula

(Deductions from 100 Per Cent)

For each 9 deduct	0
For each 8 deduct	2
For each 7 deduct	2 + 2 + 1 (½)
For each 6 deduct	2 + 2 + 1 (½) + 2 + (½ + ½)
For each 5 deduct	2 + 2 + 1 (½) + 2 + (½ + ½) + 2 + (½ + ½ + ½)
For each 4 deduct	2 + 2 + 1 (½) + 2 + (½ + ½) + 2 + (½ + ½ + ½) + 2 + (½ + ½ + ½ + ½)
For each 3 deduct	2 + 2 + 1 (½) + 2 + (½ + ½) + 2 + (½ + ½ + ½) + 2 + (½ + ½ + ½ + ½) + 2 + (½ + ½ + ½ + ½ + ½)

Collecting

For each 9 deduct	0
For each 8 deduct	2 + 0 (½)
For each 7 deduct	2 + 0 (½) + 2 + 1 (½)
For each 6 deduct	2 + 0 (½) + 2 + 1 (½) + 2 + 2 (½)
For each 5 deduct	2 + 0 (½) + 2 + 1 (½) + 2 + 2 (½) + 2 + 3 (½)
For each 4 deduct	2 + 0 (½) + 2 + 1 (½) + 2 + 2 (½) + 2 + 3 (½) + 2 + 4 (½)
For each 3 deduct	2 + 0 (½) + 2 + 1 (½) + 2 + 2 (½) + 2 + 3 (½) + 2 + 4 (½) + 2 + 5 (½)

Fig. 1—Effect of varying values of "Y" in the scoring formula used for grading canned goods

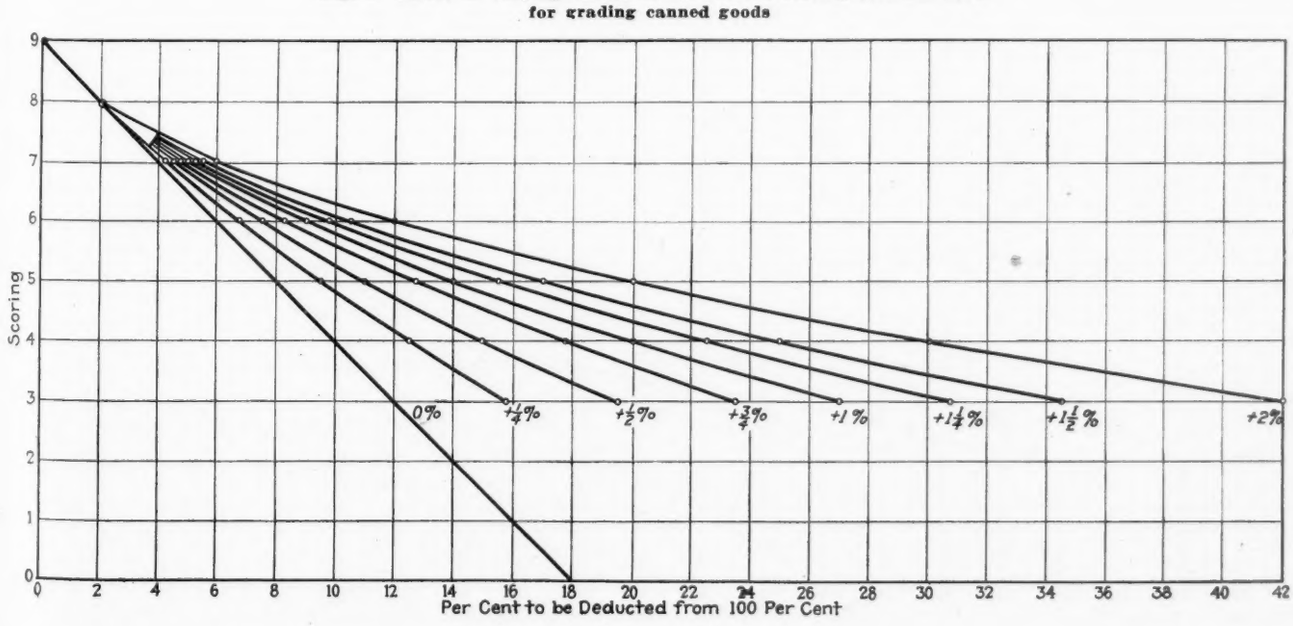


Table II—Comparison of the Effect of Varying Values of Y

"Y" equals..... +¼% +½% +¾% +1 % +1¼% +1½% + 2%
"K" equals 2%

For each 9 deduct	0 %	0 %	0 %	0 %	0 %	0 %	0% from 100%
For each 8 deduct	2 %	2 %	2 %	2 %	2 %	2 %	2% from 100%
For each 7 deduct	4½%	4½%	4½%	5 %	5½%	5½%	6% from 100%
For each 6 deduct	6½%	7½%	8½%	9 %	9¾%	10½%	12% from 100%
For each 5 deduct	9½%	11 %	12½%	14 %	15½%	17 %	20% from 100%
For each 4 deduct	12½%	15 %	17½%	20 %	22½%	25 %	30% from 100%
For each 3 deduct	15¾%	19¼%	23¼%	27 %	30¾%	34¼%	42% from 100%

press or reflect the specimen under consideration. It was necessary, therefore, to try to evolve some other method by which the acceleration was expressed in some mathematical ratio more nearly reflecting the truth.

A method of evaluating the specimen was evolved in which adequate deduction is made for each deficiency, however small, or regardless of the quality in which it occurs. The single evaluation thus reflects the aggregate value minus all of the deficiencies, to the degree in which they occur, in each of the qualities involved. This cannot be said to be the case with the old-fashioned grading, no matter how expert the grader may be. Mental allowances are made for deficiencies, but there might be quite a gap between mental allowances thus made and accurate mathematical allowances, as here recommended.

If a perfect quality is indicated by the digit 9, the value "K" is subtracted from 100 per cent for a drop quantitatively indicated by the figure 8; then it follows that a drop indicated by the figure 7 must include value "K" for figure 8, as well as value "K" for figure 7, and also an additional value "Y" for the 7, to represent the acceleration in the drop. Similarly, a drop indicated by the figure 5 must include the values "K" for figures 8, 7, 6, 5, plus the acceleration value "Y" of all of them.

The next formula developed, with this realization in mind, was the following:

		Difference
For each 9 deduct.....	0% from 100%	
For each 8 deduct.....	2% from 100%	3%
For each 7 deduct.....	5% from 100%	4%
For each 6 deduct.....	9% from 100%	5%
For each 5 deduct.....	14% from 100%	6%
For each 4 deduct.....	20% from 100%	7%
For each 3 deduct.....	27% from 100%	

A truly progressive increase inversely as the descriptive digit decreases is apparent in this case. The difference between 8 and 7 is thus seen to be 3 per cent; and the difference between 7 and 6 is this 3 per cent increased by 1 per cent, or 4 per cent, and so on, increasing every deduction by 1 per cent. This seems to give the progressive increase which expresses adequately the acceleration. This formula was used for some time.

In the foregoing formula, the difference may be designated as "plus 1," which means the addition of plus 1 per cent to the figure to be deducted at every stage. By increasing the value of this difference, represented as "Y" when subtracting it, together with the constant factor "K," or 2 per cent, from 100 per cent each time the descriptive digit is decreased one unit, an elastic formula is evolved which expresses the true evaluation of the specimen.

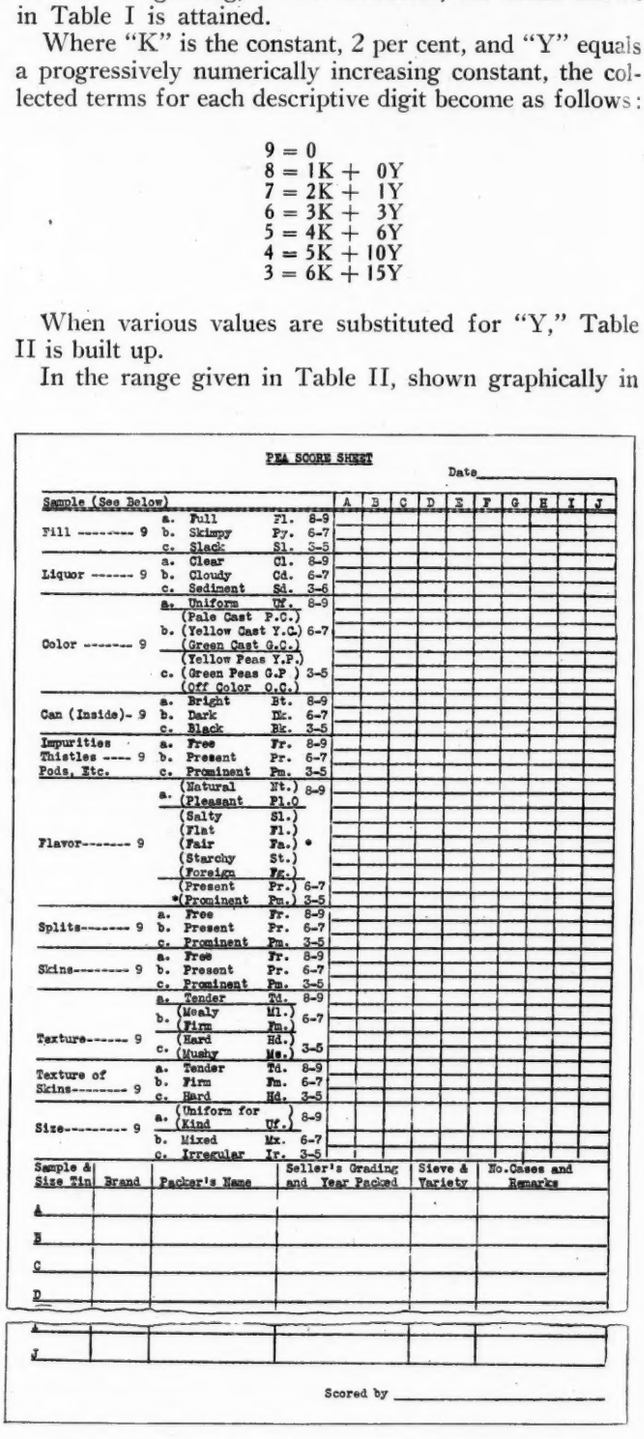
If, instead of using a value of 1 per cent for the equivalent of the value "Y," the value one-half of 1 per cent is used, the result will be quite different. To illustrate: Assuming that "K," or 2 per cent, be deducted from 100 per cent for each descriptive digit used in the grading and that the value "Y," or one-half of 1 per cent, which represents the acceleration for each of the digits used in the grading, be also deducted, the result shown in Table I is attained.

Where "K" is the constant, 2 per cent, and "Y" equals a progressively numerically increasing constant, the collected terms for each descriptive digit become as follows:

$$9 = 0$$
$$8 = 1K + 0Y$$
$$7 = 2K + 1Y$$
$$6 = 3K + 3Y$$
$$5 = 4K + 6Y$$
$$4 = 5K + 10Y$$
$$3 = 6K + 15Y$$

When various values are substituted for "Y," Table II is built up.

In the range given in Table II, shown graphically in Fig. 1, appears to lie the correct formula that reflects the condition of the specimen involved. More specifically, it may not be amiss to say that several of these formulas have been used, and experiments indicate that the answer is somewhere between the "plus ¼" formula and "plus 1¼" formula. Only extensive application to various foods by different agencies will determine which is the nearest to the truth.



PEA SCORE SHEET

Date_____

Sample (See Below)				A	B	C	D	E	F	G	H	I	J
Fill ---------- 9	a. Full	Fl.	8-9										
	b. Skimpy	Py.	6-7										
	c. Slack	Sl.	3-5										
Liquor ------ 9	a. Clear	Cl.	8-9										
	b. Cloudy	Cd.	6-7										
	c. Sediment	Sd.	3-6										
Color ------- 9	a. Uniform	Uf.	8-9										
	b. (Pale Cast P.C.) (Yellow Cast Y.C.) (Green Cast G.C.)		6-7										
	c. (Green Peas G.P) (Off Color O.C.)		3-5										
Can (Inside)- 9	a. Bright	Bt.	8-9										
	b. Dark	Dk.	6-7										
	c. Black	Bk.	3-5										
Impurities Thistles ---- 9 Pods, Etc.	a. Free	Fr.	8-9										
	b. Present	Pr.	6-7										
	c. Prominent	Pm.	3-5										
Flavor------- 9	a. (Natural (Pleasant	Nt.) Pl.)	8-9										
	(Salty (Flat (Fair (Starchy (Foreign	Sl.) Fl.) Fa.) St.) Fg.)	•										
	(Present *(Prominent	Pr.) Pm.)	6-7 3-5										
Splits------- 9	a. Free	Fr.	8-9										
	b. Present	Pr.	6-7										
	c. Prominent	Pm.	3-5										
Skins-------- 9	a. Free	Fr.	8-9										
	b. Present	Pr.	6-7										
	c. Prominent	Pm.	3-5										
Texture------ 9	a. Tender	Td.	8-9										
	b. (Mealy (Firm	Ml.) Fm.)	6-7										
	c. (Hard (Mushy	Hd.) Ms.)	3-5										
Texture of Skins-------- 9	a. Tender	Td.	8-9										
	b. Firm	Fm.	6-7										
	c. Hard	Hd.	3-5										
Size--------- 9	a. (Uniform for (Kind	Uf.)	8-9										
	b. Mixed	Mx.	6-7										
	c. Irregular	Ir.	3-5										

Sample & Size Tin	Brand	Packer's Name	Seller's Grading and Year Packed	Sieve & Variety	No. Cases and Remarks
A					
B					
C					
D					
I					
J					

Scored by _____

Fig. 2—Example of score sheet used in grading peas

The System is Simple to Apply

Though the process of creating this formula appears complicated, the application of the result is simple. As an illustration: If a specimen scored 9, 9, 9; 8, 9, 8; 9, 8, 9; there is no deduction, no matter what the formula is, where the qualities scored 9. The scoring shows a total of three 8's. No matter what formula is used, the augmented deduction is still the constant 2 per cent. Therefore, the total deduction from this specimen is 3x2 per cent, or 6 per cent, from 100 per cent. The specimen therefore scores 94 per cent.

Again, using the "plus ¼" per cent on a specimen, scores 9, 8, 7; 9, 9, 5; 9, 7, 6. In this specimen there are four 9's, for which no deduction is made. There is one 8, for which a deduction of 2 per cent must be made. There are two 7's, for which a deduction of 2x4¼ per cent, or 8½ per cent, is made; one 6, for which a deduction of 6¾ per cent is made; and one 5, requiring a deduction of 9½ per cent. Grouping these figures gives the following:

Three 9's	—Deduction	0%
One 8	—Deduction	2%
Two 7's	—Deduction	8½% (2x4¼%)
One 6	—Deduction	6¾%
One 5	—Deduction	9½%
Total deduction		26¾%
Score		73¼%

Therefore, this specimen will score 73¼ per cent.

Obviously, if one of the other formulas is used, for instance, the "plus 1¼," the results will be different. To illustrate:

Three 9's	—Deduction	0 %
One 8	—Deduction	2 %
Two 7's	—Deduction	10½% (2x5¼%)
One 6	—Deduction	9¾%
One 5	—Deduction	15½%
Total deduction		37¾%
Score		62¼%

Giving a score with this formula of 62¼ per cent.

An example of two samples of peas was given on page 340. Those two samples scored as follows:

Sample 1	Six 9's
Sample 1	Five 8's
Sample 2	Eight 9's
Sample 2	Two 8's
	One 5

If only the value of "K," or 2 per cent, is subtracted for each successive drop from perfection, sample 1 will score 90 per cent and sample 2 will score 88 per cent, as previously explained.

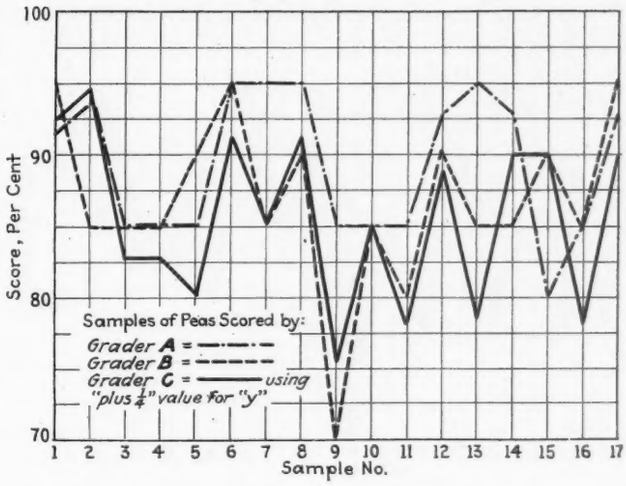


Fig. 3—Comparison of results obtained by expert graders with those of a less experienced grader using the descriptive method

But, as was pointed out previously, sample 2 scored a 5, because of the sediment present, and ordinarily would be classified as an "extra standard" pea rather than "fancy," even though its other qualities were good. It is clear that the acceleration factor is essential to make this distinction in the percentage score more marked.

Now, if the grading of these samples is recalculated, employing both the constant "K" and the accelerative value "Y," using various values for "Y," results are nearer to actual conditions. Where the "plus ¼" value for "Y" is used, the following results will be obtained: In sample 1, no deductions will be made for the six 9's, and a deduction of 10 per cent is made for the five 8's. Sample 2, however, is different. No deductions are made for the eight 9's. A deduction of 4 per cent is made for the two 8's, and a deduction of 9½ per cent for the one 5, making a total deduction of 13½ per cent. With this formula, therefore, sample 2 will score 86½ per cent, and sample 1 will score 90 per cent.

Table III—Converting Figures to Ordinary Grading Nomenclature

100%, 95%, 90%	"Fancy"	85%, 80%, 75% "Extra Standard"	70%, 65%	"Standard"

Applying the conversion table (Table III), sample 1 will grade "fancy" and sample 2 "extra standard." Thus, with this method and formula, the single evaluation will fit accepted practice, but it will do so in a way based upon

Table IV—Results of Grading by Descriptive Method Compared to Usual Method

Sample No.	Grader A	Grader B	Grade "C" Using Plus ¼%	Plus ½%	Plus ¾%	Plus 1%	Plus 1¼%	Plus 2%
1	92%—Fancy	95%—Fancy	92 %—Fancy	92 %	92 %	92%	92 %	92 %
2	97%—Fancy	85%—Ex. Std.	94 %—Fancy	94 %	94 %	94%	94 %	94 %
3	90%—Fancy	85%—Ex. Std.	83¼—Ex. Std.	82½%	81¾%	81%	79½%	78 %
4	90%—Fancy	85%—Ex. Std.	83¼%—Ex. Std.	82½%	81¾%	81%	79½%	78¼%
5	90%—Fancy	90%—Fancy	81¼%—Ex. Std.	80½%	79¾%	79%	77½%	76 %
6	92%—Fancy	95%—Fancy	92 %—Fancy	92 %	92 %	92%	92 %	92 %
7	92%—Fancy	85%—Ex. Std.	85 %—Ex. Std.	84 %	83 %	82%	80 %	78 %
8	92%—Fancy	90%—Fancy	92 %—Fancy	92 %	92 %	92%	92 %	92 %
9	85%—Ex. Std.	70%—Standard	75¼—Ex. Std.	73½%	71 %	69%	64½%	60 %
10	85%—Ex. Std.	85%—Ex. Std.	85¼—Ex. Std.	85½%	85¼%	85%	84½%	84 %
11	85%—Ex. Std.	80%—Ex. Std.	76¼%—Ex. Std.	75 %	73¾%	72%	69 %	64 %
12	92%—Fancy	90%—Fancy	87¼%—Near Fancy	87½%	87¼%	87%	86½%	86 %
13	95%—Fancy	82%—Ex. Std.	78¾%—Ex. Std.	77½%	76¼%	75%	72½%	70 %
14	92%—Fancy	85%—Ex. Std.	90 %—Fancy	90 %	90 %	90%	90 %	90 %
15	80%—Ex. Std.	90%—Fancy	89¼—Fancy	89½%	89¼%	89%	88½%	88 %
16	85%—Ex. Std.	85%—Ex. Std.	75¼—Ex. Std.	73½%	71 %	69%	64½%	60 %
17	92%—Fancy	95%—Fancy	90 %—Fancy	90 %	90 %	90%	90 %	90 %

a general principle that can be applied with a greater control of the personal element than has heretofore been possible.

One phase of the actual scoring of specimens for the canning industry may be conducted at the factory, and the sheet sent to the office, where a clerk can easily calculate the result. The grader himself also can easily calculate it, if he so desires. After a little practice, only a little time is required.

Interpretation of the percentage scoring to accepted terminology is another phase which should receive consideration. The tentative conversion table (Table III) may be used, at least until more work in this field suggests improvements.

The following is a typical example of how this method works. Samples of seventeen blocks of peas were cut and scored by two graders who have been grading peas for years and are recognized as thoroughly qualified. They were graded also by a third person who is familiar with grading, but who has not had the experience of the others. This last grader used the descriptive score sheets, an example of which is shown in Fig. 2, and methods for scoring. Results were not made known to the different graders until the entire seventeen samples were graded. The gradings were not identical with those actually put on the blocks of goods at the factory. To eliminate the possibility of the claim that there was variation in any given block of goods, the grading was done on the same can by all of the graders.

Table IV shows the results obtained by two old graders, A and B, and descriptive grader C, using the "plus $\frac{1}{4}$ per cent" to "plus 2 per cent" methods. Fig. 3 shows part of the tabulation in graph form. More specifically, it records the seventeen samples of peas scored by graders A and B with the old method of grading and by grader C using the descriptive grading, employing the "plus $\frac{1}{4}$ per cent" value for "Y."

Results obtained with the descriptive method of grading follow with fair regularity the curve of a composite of the other two. They show also, fairly consistently, a slightly lower value, which probably is due to the systematic deductions for every deficiency occurring in each of the eleven qualities enumerated on the descriptive score sheet, whereas the other graders made these allowances mentally.

Taken all in all, even with the values tentatively adopted, the results are promising and warrant additional study and application.

▼ ▼ ▼

Recent United States Patents for Quick-Freezing Systems

THE STATUS of quick-freezing, past, present, and future, is so intimately tied up with the great amount of research and development work carried out that no picture of the industry can be complete unless it includes the record of the United States Patent Office. Listed below are practically all of the patents in this field issued in recent years complete to July 1, 1930. Although the list is the result of considerable conscientious work, it is possible that there are omissions. It would be appreciated if our readers would bring any such omissions to our attention.

Earlier United States patents on systems not now in use, as well as those of a number of foreign countries, may be found by reference to "Refrigeration of Fish," by Harden F. Taylor, Bureau of Fisheries, Document No. 1,016. It should be kept in mind that numerous unissued patent applications on this subject are still in the Patent Office, some of which were filed more than five years ago. Many of the most prominent recent developments fall into this class, but the information is not public property at this time.

The list has been divided into four groups under the organization or individual concerned with the development work now making use of the patent.

Number	Date	Patent Issued to, or Application Filed by	Remarks
Atlantic Coast Fisheries Company Patents			
183,341	4/29/27	Chesebro Bros. & Robbins, Inc.	Trademarks
189,094	9/9/24	Chesebro Bros. & Robbins, Inc.	
189,852	9/30/24	Chesebro Bros. & Robbins, Inc.	
*260,057	8/13/29	Atlantic Coast & Fisheries Co.	
*1,456,666	5/29/23	James J. Barry	Fish scaler
1,468,050	9/18/23	Harden F. Taylor	Brine spray tunnel
*1,602,650	10/12/26	Alexander H. Cooke & Charles F. Taylor	Smoking apparatus
1,614,455	1/18/27	Alexander H. Cooke	Cake freezer
1,710,386	4/23/29	Harden F. Taylor	Fish fillet wrapper
*1,760,091	5/27/30	Harden F. Taylor	Smoke treatment
General Foods Corporation (Frosted Foods, Inc.) Patents			
Re 16,740	9/20/27	Clarence Birdseye	(see 1,608,832)
206,439	12/1/25	Gen'l Seafoods Corp.	Trade marks
*209,404	2/23/26	The Fort Company	
261,740	9/24/29	General Foods Corp.	
1,140,178	5/18/15	Alex. M. McDougall	Package freezing
*1,415,296	5/9/22	James J. Barry	Fish scaler
*1,485,823	3/4/24	James J. Barry	Smoking process
*1,507,724	9/9/24	James J. Barry	Fish scaler
1,511,824	10/14/24	Clarence Birdseye	Freezing fillets in cans
*1,545,631	7/14/25	James J. Barry & Horace H. Anthony	Rotary tool
*1,552,463	9/8/25	James J. Barry	Filleting machine
1,561,503	11/17/25	James J. Barry & Clarence Birdseye	Brining machine
1,562,280	11/17/25	James J. Barry	Handling machine
*1,596,649	8/17/26	James J. Barry	Skinning machine
1,608,832	11/30/26	Clarence Birdseye	(Reissued as 16,740)
*1,617,006	2/8/27	James J. Barry	Corn cooking
1,630,985	5/31/27	Henri L. P. Tival	Pulverizing organic material
*1,642,802	9/20/27	James J. Barry	Fish scaler
*1,647,170	11/1/27	James J. Barry	Filleting machine
*1,648,931	11/15/27	James J. Barry	Trimming tool
*1,722,450	7/30/29	James J. Barry	Trimming tool
*1,746,813	2/11/30	James J. Barry	Fish scaler
1,759,682	5/20/30	Clarence Birdseye	Preparing packages
Robert E. Kolbe Patents			
1,527,562	2/24/25	Robert E. Kolbe	Diving bell
1,641,441	9/6/27	Robert E. Kolbe	Floating pan
Paul Willer Petersen Patents			
Re 15,683	9/4/23	Paul W. Petersen	(See 1,422,126)
171,315	8/7/23	Paul W. Petersen	Trademark
1,388,295	8/23/21	Paul W. Petersen	Direct immersion apparatus
1,388,296	8/23/21	Paul W. Petersen	
1,388,297	8/23/21	Paul W. Petersen	
1,388,298	8/23/21	Paul W. Petersen	Glazing process
1,420,739	6/27/22	Paul W. Petersen	Processing before freezing
1,420,740	6/27/22	Paul W. Petersen	
1,422,126	7/11/22	Paul W. Petersen	Freezing process and apparatus (reissued as 15,683)
1,487,883	3/25/24	Paul W. Petersen	Container glazing
1,509,850	9/30/24	C. J. Thompson & Paul W. Petersen	Package freezing
1,528,890	3/10/25	Paul W. Petersen	Freezing cans
1,528,891	3/10/25	Paul W. Petersen	
1,584,191	5/11/26	Paul W. Petersen	Can dumping apparatus
1,660,045	2/21/28	Paul W. Petersen	Freezing cans
1,681,009	8/14/28	Paul W. Petersen	Germicide processing
1,689,965	10/30/28	Paul W. Petersen	Freezing tank arrangement

* Cover allied operations, but not refrigerating processes proper.

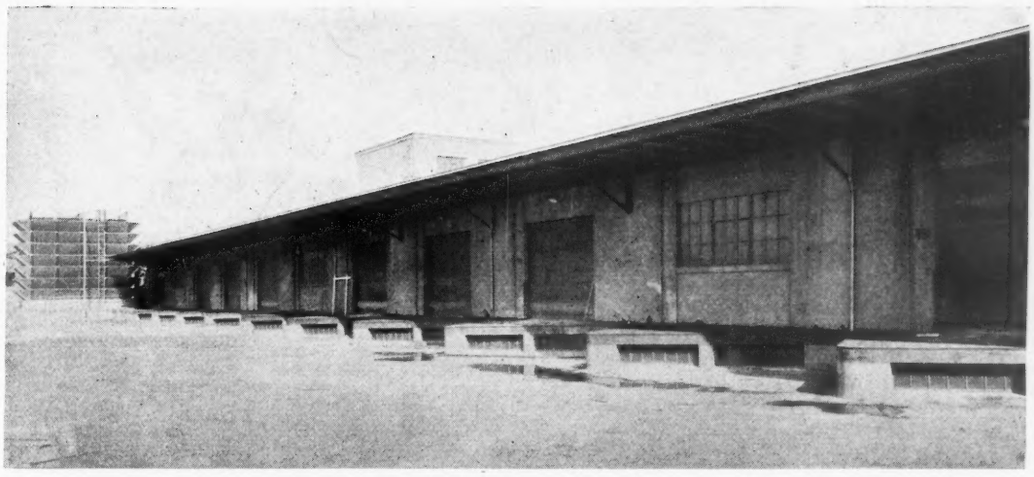


Fig. 1—For receiving shipments by motor truck, the upper level is provided with a saw-toothed unloading platform

Shipside REFRIGERATOR TERMINAL

Adds to Harbor Facilities

At San Francisco

ADVANTAGES of prompt cooling of freshly picked fruit are well known. By decreasing the respiration rate the fruit is kept from becoming overripe before it reaches the consumer and the growth of molds or other disease organisms is inhibited. Shippers and pomologists have known for many years that hot fruit placed in refrigerator cars or ships may take several days to cool down to the desired shipping temperature. Because of this effect, icing or refrigerating costs en route may be very high. Thus in all the shipments of oranges from southern California to Eastern markets in 1929, freight and icing charges en route represented about one-third of the delivered value of the fruit.

To get around these difficulties and high costs, the practice of "precooling" the fruit has arisen. This simply means that, as promptly as possible after picking, the fruit is placed in cold storage until it reaches shipping temperature and then is transferred to cars. This practice insures positive cooling and decreases the amount of refrigeration required en route. In fact, some fruits that have been precooled—oranges and lemons, for example—may be shipped without ice in ventilated refrigerator cars. But, where distances are great or water transportation is used, or the more easily perishable deciduous fruits are concerned, refrigeration in transit will continue to be used.

The ideal situation for precooling exists where cold-storage facilities are present in the fruit-growing areas, and in a few places such cold-storage warehouses have been built. The next best thing is to have refrigerating terminals in important shipping centers, as close as possible to the orchards or berry fields.

Interest has been growing in recent years in the water transportation of Pacific Coast fresh fruit products, both to the Eastern seaboard and to foreign markets. The advantage of ocean freight rates over railroad rates is, of course, well known. For example, the actual shipping time between Buenos Aires and New York, and between Buenos Aires and San Francisco, via the Panama Canal, is nearly the same. Freight rates are also almost equal. The time difference varies from a few hours to a day or so, and the freight rate differs by a few cents. But a recent shipment of California pears to the Argentine had to be sent via rail to New York at $1.25 a box rail-freight, and thence by steamship from New York to Buenos Aires at a water-freight rate that was but little less than the direct all-water rate from San Francisco to Buenos Aires.

To take advantage of the benefits of water transportation of perishable food products requires a supply of refrigerator ships and a shipside cold-storage terminal; the latter to store the fruit or other food products between sailings and while loading. While most of the steamship lines entering San Francisco own refrigerator ships, that port has been without shipside cold-storage terminals, though such plants have existed in Seattle, Portland, and New Westminster (B. C.) for several years. The State Cold Storage Plant at San Francisco, completed about May 1, 1930, in time to receive the first of the 1930 crop of deciduous fruits, is the most recent addition to the list of Pacific Coast shipside cold-storage terminals.

The plant occupies a part of the second floor of the State Products Terminal, on the China Basin, at the

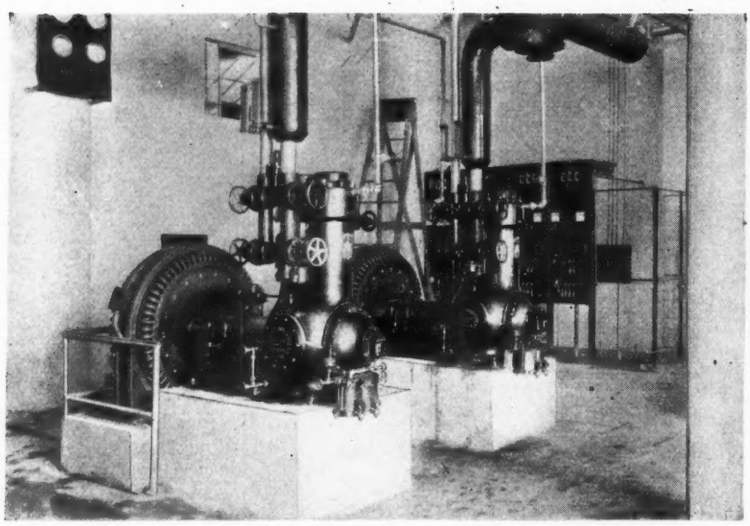


Fig. 2—Two 27.5-ton ice machines provide refrigeration for the brine that is circulated through the pipe bunkers in the cold-storage rooms

south end of the Embarcadero. Like all of the San Francisco waterfront buildings, the Products Terminal is state-owned. It is controlled by the Board of Harbor Commissioners, the engineering department of which designed and built the cold-storage plant at a cost of about $300,000. The terminal was originally designed for a six-story building, though only two stories have been built so far. The foundations and construction are heavy enough, however, so that the additional four floors may be added whenever necessary.

The cold-storage portion of the terminal is divided into seven rooms of varying size. The smallest is 33x50 ft. and the largest 64x80 ft. The total floor space is 19,000 sq.ft. and the total volume available for cold storage is 215,000 cu.ft. Using apples as an example, this is sufficient to store 90,000 boxes, awaiting shipment. Walls, floors, and ceilings are insulated with 4 in. of cork.

Two spur tracks of ten-car capacity each, on the north, or land, side of the building provide for receiving shipments by rail. An upper-level street over the spur tracks, reached by a long ramp curving in from the Embarcadero, takes care of motor-truck shipments, which are thus unloaded only a few feet from the cold-storage rooms and on the same level with them. The outer edge of the second-floor loading platform has a saw-tooth edge, forming bays into which a truck may back with a minimum of maneuvering. A roof is built over the platform so that truck loading or unloading is done in the shade. Freight cars are similarly sheltered by the upper-level street.

Hand-trucking, normally by the ordinary cannery or clamp truck, will be used for short hauls on the level. For longer trips, gasoline or electric mobile equipment will be used. Doors to the cold rooms are wide enough for two loaded trucks to pass.

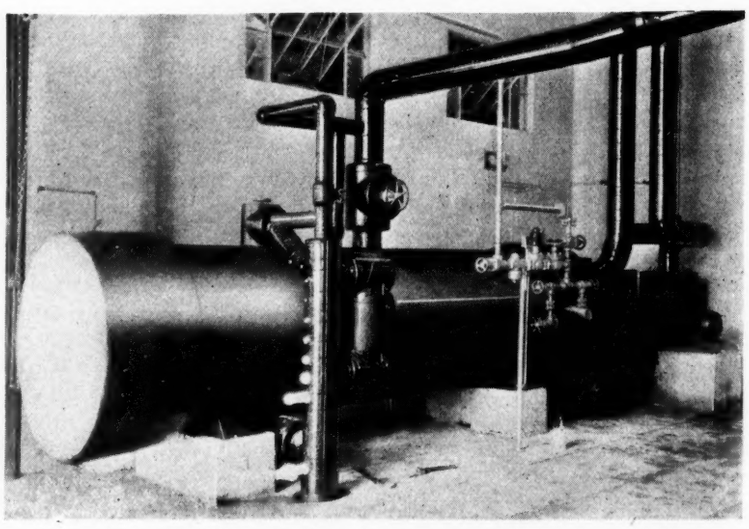
For downward movements, two spiral metal chutes capable of handling 30 boxes a minute each will be used. For upward movements, there is an Otis freight elevator opening both ways and fully automatic, including door-opening and closing and floor-leveling. A drag elevator or escalator, with a capacity of ten boxes a minute, installed in an unused elevator shaft, will also be used. While the materials-handling equipment is simple it has been necessary to plan it so that cooled and non-cooled products, either from landside or shipside, and moving up or down, can be handled with a minimum of confusion.

On the ship side of this pier there is a second-story loading platform, 1,036 ft. long. This has been extended to pier 46 adjacent (pier 48 is the cold-storage terminal) and will ultimately be extended to pier 44, so that should it be necessary, 3,200 ft. of berthing space can be made available for ships loading cooled products. When ships are docked immediately alongside the cold-storage plant proper, it is 40 ft. from building to shipside, or about 65 ft. to the center of the hatches. By loading the slings within the cold rooms, products can be transferred to ships' holds with less than a degree rise in temperature. By using gasoline or electric tractor trains for the longer hauls to more distant berths, loadings will be almost as rapid. The depth of the water at the pier is 35 ft. at mean low-water level, which is 48 ft. below the deck of the pier.

The storage rooms are cooled by brine circulated in pipe bunkers installed near the ceiling. This type of cooling is preferred for fruit cooling and storage, as leaks are less likely to damage the stored materials. The bunkers extend between the doors in the north and south walls of the room, so that the trucking aisle is beneath them, thus permitting higher storage space on the sides of the room and avoiding damage in case of a brine leak.

A forced air circulation is furnished by a fan at one end of each bunker. The fan intake is connected to a 9-in. galvanized iron pipe along the walls and the discharge to a similar 10-in. pipe with louvers along the sides between the bunkers. The discharge pipe also goes out through the wall of the room at the end opposite the fan, so that, by closing the louvers and opening a damper in the wall, the air in the cold room can be completely changed in twelve hours.

Fig. 3—The horizontal brine cooler, which provides some brine storage, is served by pumps that circulate the cooled brine through the pipe bunkers



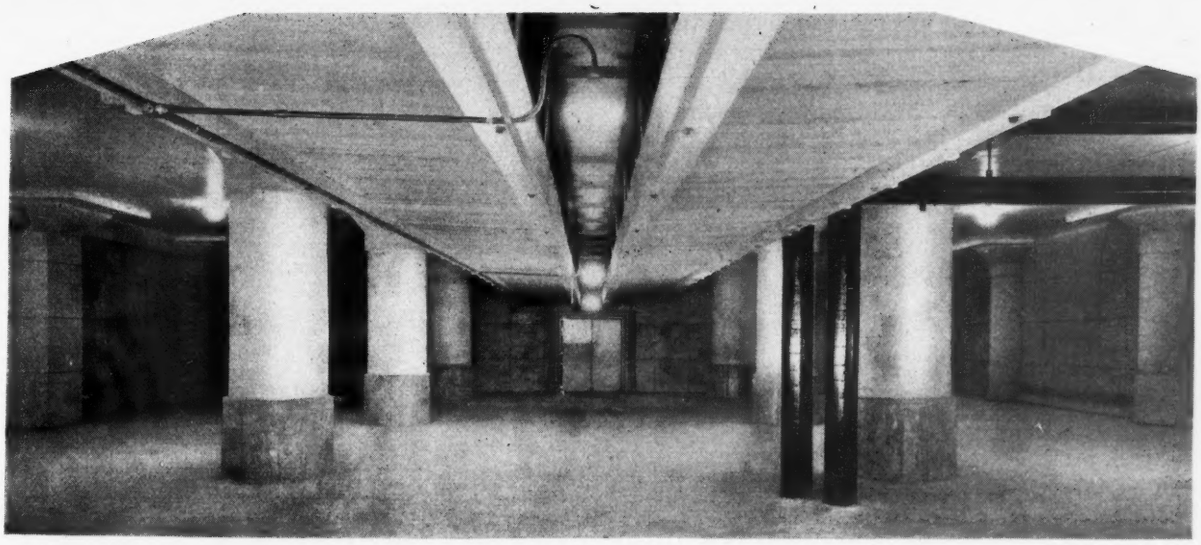


Fig. 4—In the storage rooms the pipe bunkers are placed directly over the trucking aisles, conserving storage space and avoiding possible damage to stored goods from leaks

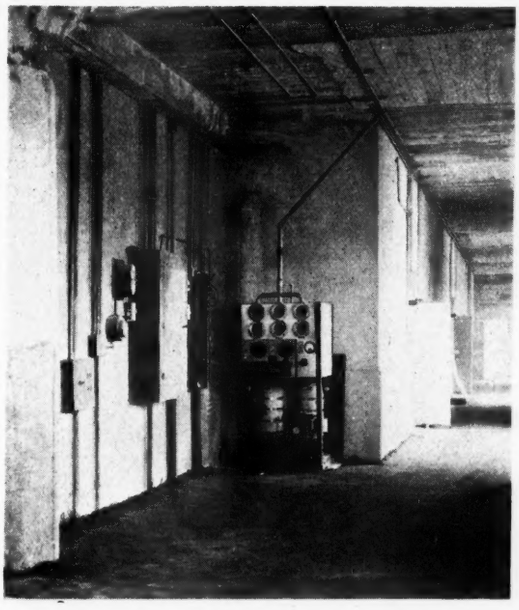


Fig. 5—This central ozone system supplies all the storage rooms and helps keep the contents in good condition

Each room is equipped with a brass pipe line for ozone with jets or outlets at intervals under the bunkers. Ozone is supplied from a central machine made by the Pure Airifier Company. Ozone in the air of cold-storage rooms has been shown to keep the air fresh and sweet at smaller expense than by changing it at intervals; to lessen the necessity for careful humidity control; and to make possible the storage of odorous vegetables, such as onions and cabbage, in the same room with other vegetables for a longer period of time. (Lohman, *Refrigerating Engineering*, 17; 122-3, April, 1929.)

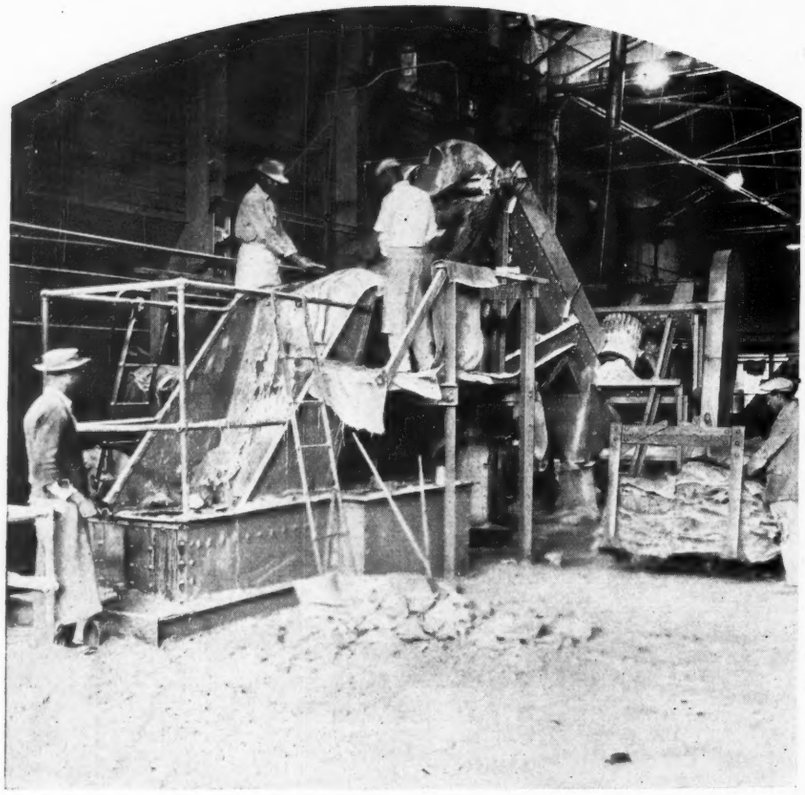
The refrigerating machinery of the plant consists of two 27.5-ton Baker ice machines driven by 50-hp. General Electric synchronous motors, a horizontal brine cooler, an outdoor cooling tower and condenser, and the necessary brine and water circulating pumps. The latter are Fairbanks-Morse direct-connected centrifugal pumps. Mercoid controls are used wherever automatic temperature control is required.

The temperature of the rooms will be varied according to the requirements of the products stored. Since it is expected that the plant will be mainly used for deciduous fruits, stored while awaiting water shipment, the temperatures used will be normally 30-34 deg. F. No provision for the immediate storage of frozen products has been built into the present plant, though the need has been considered and space has been set aside for it so that equipment can be installed.

An interesting feature of the plant lies in the fact that it has been planned for rapid expansion in size. The cold-storage rooms occupy only about a third of the space that might be used for them. A second elevator shaft is alongside the present one and the elevator now in use has been wired for six floors instead of only for the two that now exist. In the compressor room a foundation has been poured for an additional compressor and space left for a second brine cooler. Likewise, space has been left for an additional switchboard panel and wiring has been installed for the electrical equipment that would be required if the storage capacity were doubled. The cooling tower is large enough for twice the amount of cooling now necessary and space for another ammonia condenser has been provided. Even the capacity of the ozone generator is twice that of present needs. Should the traffic in cooled deciduous fruits ever warrant the expansion, the capacity of the plant could be doubled without interfering with the facilities already in use.

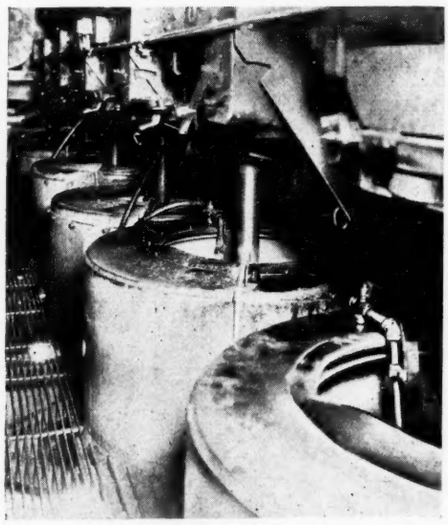
While the State Cold Storage Plant was built with the expectation that it would be used primarily by the fruit growers and shippers, it will be available for other cold-storage shipments to be made by water. Privately owned cold-storage warehouses, however, probably will handle such products as eggs, poultry, meat, and dairy products for some time to come, leaving the state-owned terminal for the highly perishable fruits and vegetables.

This is not the largest of the Western terminals of its type but is ample for present needs. A large traffic in fresh deciduous fruits to foreign countries must await an increased number of refrigerator ships and a larger number of cold-storage terminals at their ports of call. More refrigerator cars on foreign railroads also are necessary if markets are to be extended to other than sea coast cities. Finally, in many instances the markets themselves must be developed. It is hoped that the Pan American Reciprocal Trade Conference to be held at Sacramento in August will aid in developing South and Central American markets for Western fruits and products. When these markets have been developed there will be ample time and ample room for expansion of the San Francisco cold-storage terminal to take care of them.

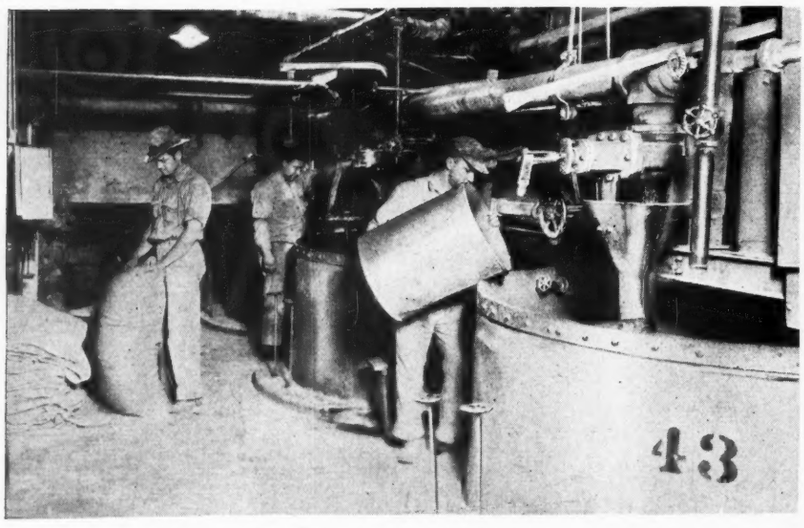


The "cut-in" station, where bags of raw sugar from Cuba are opened and dumped into a chute, then conveyed to the first step of the refining process

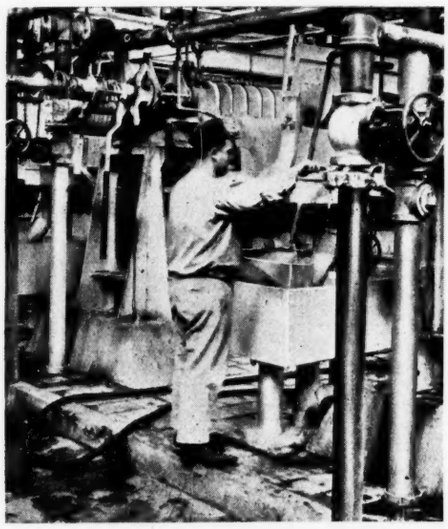
SUGAR REFINING
Under Technical Control



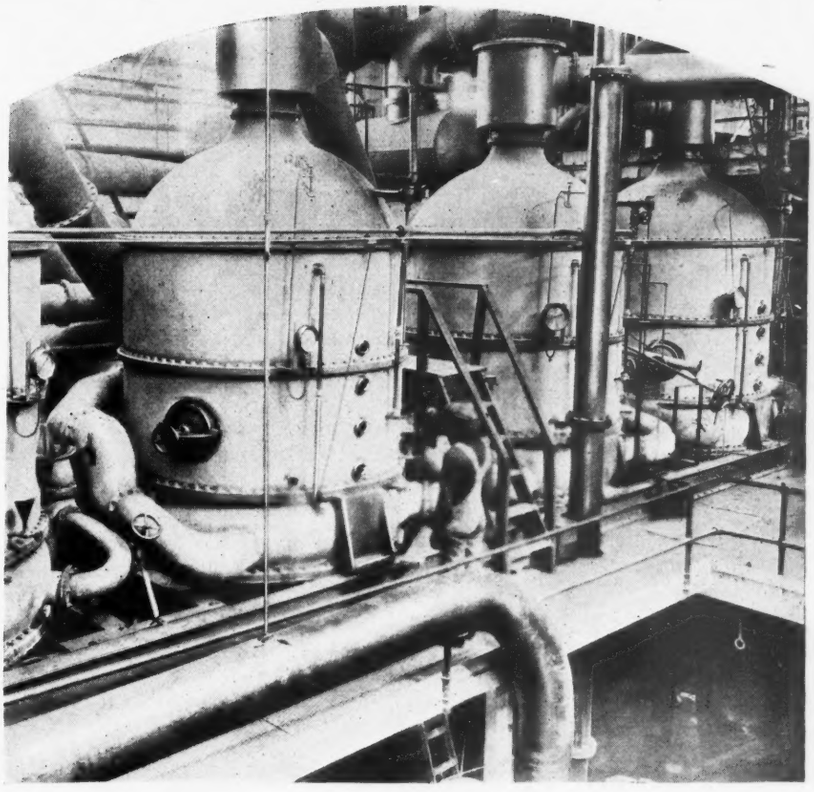
The raw sugar is first placed in these centrifugal machines, where it is washed with hot water to remove surface impurities



After the sugar from the centrifugals (which is 99 per cent pure) has been melted with pure filtered hot water, Johns-Manville Celite is added as a filter-aid, as shown in this picture



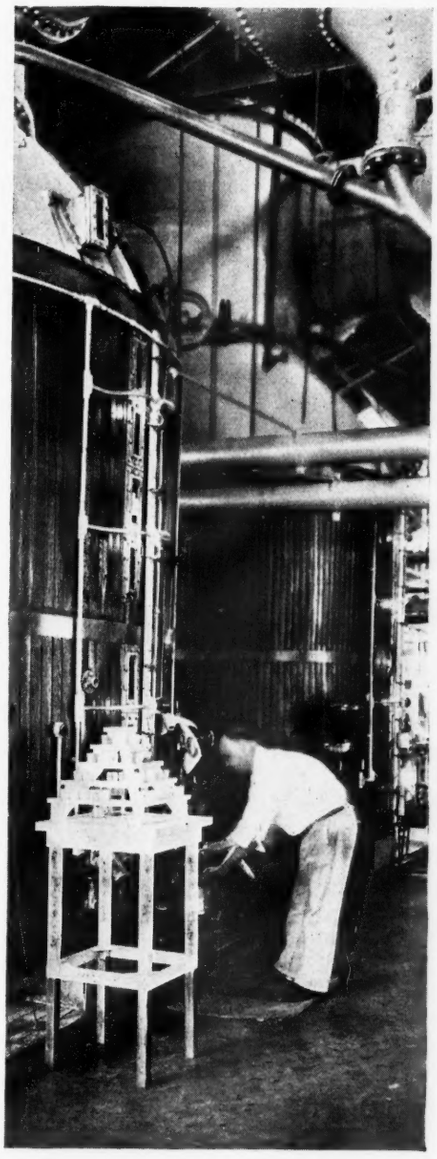
The battery of Sweetland filter presses, through which the melted sugar liquor and filter aid are pumped to produce a light yellow liquor, which, after a second filtering through charcoal, becomes a clear white liquor



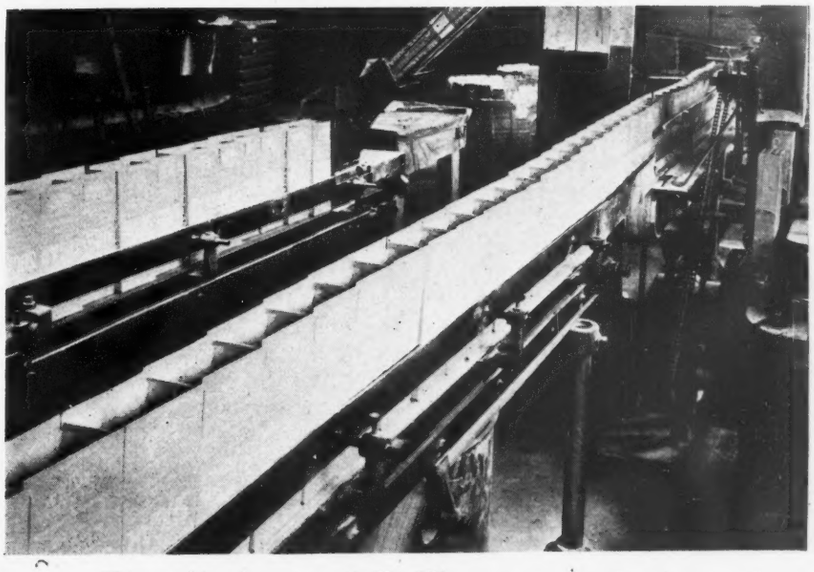
The white liquor from the filtering process is thickened in these large evaporators, which reduce the moisture content prior to the boiling process that causes crystallization

At the Savannah Sugar Refining Corporation

Keystone View Company Photographs



After concentration in the evaporators, the white liquor is boiled in these vacuum pans until the crystallizing point is reached. Careful control of this process determines the size of sugar crystals obtained



This machine for automatically filling two-pound cartons is one of the devices used for packaging the finished sugar

Why Freeze Fruit In Sirup?

By M. A. JOSLYN
Fruit Products Laboratory
University of California

OXIDATION and cell injury undoubtedly are the most important difficulties faced in the preservation of fruits by freezing. Changes in color and flavor are ascribed to the activity of the enzyme oxidase secreted in the fruit tissue. Changes in texture, which yield a thawed product that is collapsed, limp, and soggy, are the result of injury to the plant cells.

From the inception of the cold-packing of perishable fruits in the Pacific Northwest, sugar has been added to retard the development of yeasts and molds, to reduce the danger of fermentation, and to preserve color, flavor, and aroma. Although sugar exerts its full value when uniformly incorporated in crushed fruit, it has not been satisfactory in solving the major difficulties when used with whole fruit.

A great deal of experimental work has been done with fruits packed with sugar.[1] The use of dry sugar for berries in small containers and in 5-gal. cans was investigated by the author in 1928 and 1929. Although care was taken to distribute the dry sugar uniformly with least damage to the fruit, in many cases the product was unattractive in appearance. The sugar formed a heavy sirup which settled to the bottom, carrying with it the unabsorbed sugar and leaving the upper berries exposed. These exposed berries were less sweet, possessed a disagreeable oxidized flavor, and were generally discolored. The bottom berries had a better color and fresher flavor, but were too sweet, and sometimes too tough, as a result of the action of the thick sirup. Moreover, when the frozen fruit began to thaw it tended to settle in the container, thus giving it a slack-filled appearance when opened, although it had been well filled when packed. This may be ascribed to the limp texture of the thawed berries and to extraction of water by the added sugar. The sugar-pack method is even more unsatisfactory for such fruit as figs, apricots, and grapes.

In an intensive study of the frozen-pack method of preserving berries, H. C. Diehl[2] found that the use of sugar has some disadvantages, because it "causes a withdrawal of the water from the fruit. The sugar dissolves in this juice and forms a concentrated sirup which gradually drains to the bottom of the container. . . . One of the results of this withdrawal of water from the berries is a shrinkage in tissue volume more or less proportional to the sugar concentration. . . . In high sugar concentration the tissues may become tough and leathery."

To avoid some of these difficulties, the development of a sirup packing method was undertaken as early as 1919 in the Fruit Products Laboratory of the University of California.[1-b, c] It was found that freezing fruit submerged in water or sirup maintains the fresh color of apricots, cherries, loganberries, raspberries, and strawberries in a very satisfactory manner. On the whole, solutions of sugar preserve the flavor and texture much better than water alone, and the fruit packed in sirup kept longer after being thawed. When frozen in water, peaches and apricots were rendered quite soggy and were given a "watery" flavor. A sugar solution of 15 deg. Balling maintained the texture of strawberries better than water; the texture further improved, however, when stored in a sirup of 30 deg. Balling, and was most satisfactory in 60-deg., Balling, sirup. A 30-per cent sugar solution was found best for raspberries, higher concentrations giving no improvements. Apricots in 30 per cent sirup were too sweet, and Royal Anne cherries were as well preserved in water as in sirups of 10 to 40 per cent.

The following limitations to the use of a 60-deg., Balling, sirup were apparent as the result of this investigation. Objections listed under 2, 3, and 4 could be avoided by rapidly freezing the mass and removing excess sirup.

1. When sugar is high in cost the expense is objectionable.
2. The tendency of berries to float in the heavy sirups is so marked that the soft fruit in large containers may become crushed.
3. High concentrations of sirup favor shrinkage of the berries or loss of moisture through plasmolysis, by reason of the osmotic action exerted. The plasmolyzed fruit becomes tough, and some of the color and flavor apparently is diffused from the fruit into the heavy sirup.
4. The high concentrations of sugar sirups imparted a flavor which is too sweet for many fruits.

In spite of these limitations, investigations carried out in 1928 and 1929 demonstrated the following advantages for the sirup-pack method[3]:

1. Air discoloration is reduced to a minimum.
2. Sirup is more convenient than sugar, especially if the latter is to be distributed uniformly throughout the mass of fruit.
3. There is less damage to the fruit during the addition of sirup than during the addition of sugar.
4. There is little or no change in fruit volume from loss of water from the fruit and no settling of the fruit in the container such as occurs in the sugar pack.
5. Sirup is a better aid to preservation during freezing than sugar. It can be chilled before use and acts as a pre-cooling agent.
6. The texture of the thawed fruit is better.

Table I—Drained Weights of Raspberries and Strawberries Packed With Sugar.

(After Diehl, U.S.D.A. Tech. Bulletin 148)

		Before Freezing		After Thawing		
Fruit	Pack	Weight of Fruit Pounds	Weight of Sugar Pounds	Weight of Fruit Pounds	Weight of Sirup Pounds	Balling Degree of Sirup
Raspberries	2 + 1	300	150	342	201	50
	2 + 1	300	150	238	210	50.5
	2 + 1	300	150	298	155	56.4
Strawberries	2 + 1	300	150	192	258	49.0
	2 + 1	300	150	164.5	282.5	45.3
	2 + 1	300	150	157	293	43.7

7. The sirup pack is applicable to all fruits.

The findings of this laboratory were confirmed by a number of other investigators[4]. Peaches, pears, muscatine grapes, blackberries, raspberries, and figs are best frozen covered with a sirup made by dissolving 6 to 8 lb. of sugar in each gallon of water, according to J. G. Woodruff[5]. In the April, 1930, issue of *Food Industries,* Diehl[6] reported that for sirup and sugar packs of fruits of comparable concentrations, the sirup pack has invariably been more desirable. He found[7] that a 50-deg. sirup was the minimum concentration necessary for color retention in strawberries and that it was necessary[8] to use both "a high-degree, Brix, sirup" and "absolute exclusion of air" to prevent discoloration, during storage, for apricots, peaches, cherries, and pears frozen in small containers.

The chief value of sirup in preventing discoloration lies in the fact that air is excluded from the surface of the fruit. When air is present, the oxygen is activated

Table II—Drained Weight and Balling Degree of Sirup in Sirup-Packed Halved Cling Peaches Frozen in Small Containers

		Sample 1	2	3	4	5
Weight of fruit (grams)	Before freezing	437	441	421	441	538
	After freezing	434	424	386	384	364
Weight of sirup (grams)	Before freezing	492	530	571	589	454
	After thawing	475	516	575	622	576
Balling degree of sirup.	Before freezing	22.5	40	50	60	70
	After freezing	21	36	42.5	50.5	52

through the agency of the peroxidase, probably by the formation of an organic peroxide, and this then oxidizes the chromogen, a substance of tannoid nature, which upon being oxidized gives rise to a brown pigment. Of course, the full value of the sirup in preventing this oxidation can be accomplished only by freezing the fruit completely submerged in sirup. Because of the tendency of the fruit to float, it is necessary, especially in large containers, to use a perforated false top to keep the fruit submerged during the freezing.

Although its action in regard to the prevention of oxidation is fairly well established, the value of sirup in preserving the texture of the fruit is not so well understood. In spite of the mass of definite and, in some cases, conflicting statements concerning the cause of breakdown in texture on freezing, published in recent issues of trade journals, the exact nature of the injury is not definitely established, at any rate, for plants. No extensive scientific study has been made of the rôle of temperature, rate of freezing, of the kind of concentration of sugar or sugar solutions, or of the effect of other chemicals, on injury to texture of fruits. It is true, however, that a great number of investigators have studied and are still working on the related problem of the freezing to death of plants. Most reported work on changes in texture has been limited to animal products.[9]

The widespread view that water freezes within the plant cells and that its consequent expansion bursts the cells has been shown to be false by W. H. Chandler[10] and others. During freezing, water is withdrawn from the cells to the intercellular spaces where the ice first forms. As freezing proceeds, these spaces become filled with ice, the cells are forced apart by the pressure of the ice, and "death" of the cell occurs. It is fairly certain that "death" of the plant is not caused by the mechanical rupturing of the cell walls by ice crystals nor by desiccation due to removal of water on freezing. The exact nature of the phenomenon of "freezing to

Table III—Drained Weight of Commercially Peeled and Halved Cling Peaches

Container	Kind of Pack	Weight of Fruit (Pounds) Before	After	Weight of Sirup (Ingoing)	Balling Degree of Sirup Before	After
5-gal. can	In 40 deg. sirup	21.5	18.75	18.25	40	30
5-gal. can	In 50 deg. sirup	21.75	19.00	18.75	50	37.5
Fiber box	Plain	28.25	22.25	.....	..	....

death" in plants, however, is closely related to the changes in texture upon thawing.

It is possible that the problem of changes in the texture of fruits by freezing could be clarified by attacking it from the chemical as well as the physical point of view. This has already been done by M. A. Maximow[11] in studying the freezing of plants. It is known that the turgidity of living plants, and also of living fruits containing about 80 per cent water, is chiefly due to the action of the colloids present. The setting of about 99 parts of water to stiff jelly by the addition of one part agar is a well known example of this. Previous investigators have found that hydrogels suffer colloidal changes upon freezing, and, in the case of plants, this causes loss of impermeability and outflow of cell sap. The change from the gel to a sol condition probably is chiefly responsible for the breakdown.

Cell sap that can be expressed only by high pressure from a living beet or potato will run out of its own accord, similar to water from a sponge, after the plant has been killed by cold. Maximow found that plants frozen in their own sap or in sugar solutions are more resistant to such cold injury. The protective action of sugar and other materials performs its chief function during freezing, when most of the injury to the fruit takes place, and has no direct connection with osmotic pressure and freezing-point lowering of the sap. It seems logical, therefore, to consider that this protective action of the sugar sirup on fruits has an intimate connection with the changes in colloidal characteristics that take place during the freezing operation.

Thus freezing in sugar solutions has scientific as well as practical justification. The exact concentration of sugar in solution to be used for best results cannot be definitely stated, for it will vary with the variety of fruit, seasonal effects, and other conditions. Although a

Table IV—Drained Weights of Sirup Packed Strawberries in Small Containers

Container	Kind of Pack	Before Freezing—(Grams) Weight of Fruit	Weight of Sirup	After Freezing Drained Weight (Grams)	Degrees Balling
Tulip Cup	Unhulled, unwashed, in water	121	183	92	4.5
Tulip cup	In 10 deg. sirup.....	111	204	72	11.3
Tulip cup	In 20 deg. sirup.....	112	187	103	18.4
Tulip cup	In 30 deg. sirup.....	117	201	101	25.5
Tulip cup	In 40 deg. sirup.....	111	256	95	32.2
Tulip cup	In 50 deg. sirup.....	121	226	112	41.0
Tulip cup	In 60 deg. sirup.....	111	225	97	48.0
Tulip cup	In 70 deg. sirup.....	111	270	101	54.0
Tulip cup	Hulled, in water.....	131	161	83	6.2
Tulip cup	Hulled, in 60 deg. sirup	115	169	84	43.5

40-deg., Balling, sirup (5.55 lb. of sugar per gallon of water) generally is satisfactory, it may be not sweet enough for some fruits, too sweet for others, and in certain cases may affect the texture adversely. The more acid the fruit, the more concentrated a sirup can be used without affecting the taste. A 25-deg., Balling, sirup has been found satisfactory for freezing grapes and for cling peaches for later use in canned fruit salad.

Although an increase in the sugar concentration has but little effect in preventing discoloration in submerged fruit, it has a marked effect on the extraction of juice from the fruit, especially in softer varieties of fruits.

Table V—Drained Weight of Raspberries Frozen in 2-Lb. Tin Cans

Treatment	Before Freezing Weight of Berries (Grams)	After Thawing Out — Drained Weight (Grams)	Balling Degree
Plain	250	181	....
In 40 deg. sirup	250	206	30
In 60 deg. sirup	250	196	41
2 + 1 sugar	250	190	.....
3 + 1 sugar	300	270	.....

Osmotic action of the sugar sirup plays an important part in the decrease in weight of frozen fruits and vegetables that occurs after thawing. When a product is frozen in unsweetened form, the water which separates during freezing and is not reabsorbed on thawing, leaks out through the ruptured tissues and causes a decrease in the drained weight. When sugar is added, water also is drawn from the fruit tissues by osmosis, the water passing out through the fruit and dissolving the sugar to form a concentrated sirup. When a heavy sirup is used, water will be extracted the same way as with crystalline sugar, but in lesser amounts. By using a sirup of the proper concentration and osmotic pressure, it is theoretically possible to prevent all extraction of water or juice, but this cannot be attained perfectly in practice, because uncontrollable factors may influence the osmotic pressure in the fruits. Moreover, other factors in addition to osmotic pressure must be taken into consideration when determining the concentration of the sirup to be used.

The factors that determine the changes in drained

Table VI—Drained Weights of Raspberries and Strawberries Packed in 38 Deg., Balling, Sirup in Glass and Paper Jars

Fruit	Before Freezing — Weight of Berries, (Grams)	Before Freezing — Volume of Sirup	After Freezing — Drained Weight, (Grams)	After Freezing — Balling Degree
Strawberry	523	350	382	24
Strawberry	255	160	208	26
Strawberry	269	170	205	26
Strawberry	267	146	190	25.5
Strawberry	466	300	394	25.0
Strawberry	227	149	168	28.0
Strawberry	112	93	86	30.0
Strawberry and raspberry	503	300	360	25.5
Strawberry and raspberry	454	140	423	28.5
Strawberry and raspberry	198	208	192	30.5
Strawberry and raspberry	217	200	203	30.0

weight of the frozen foods on thawing may be classified as follows:

1. The nature of the product; that is, whether tender or tough and fibrous, or of high or low water content.

2. The method of packing; whether in sugar, water, or sirup, the concentration of sirup and the relative proportions of fruit and sirup, and the relative quantity of sugar added as such or in sirup.

3. The size of container, because the weight of the fruit above, expressing juice from that below, affects drained weight.

In the accompanying tables are summarized a number of tests which show the drained weight of several fruits packed by various methods. As it was impossible to control all of the factors, the results are not entirely consistent. It is clearly evident, however, that the loss in weight after freezing is less in the 40-deg. sirup pack

Table VII—Drained Weights of Blackberries Packed in 39.5 Deg., Balling, Sirup in Tin Containers of Various Sizes

Size of Container	Weight of Berries Before Freezing (Grams)	Drained Weight After Freezing (Grams)	Balling Degree of Sirup After Freezing
2 oz. can	50	53	35
8 oz. can	100	103	34
No. 1 tall can	200	208	34
No. 2 tall can	250	252	34
No. 2½ can	400	390	34
No. 10 can	2,000	1,415	34

Table VIII—Drained Weight of Phillips Clingstone Peaches Stored in Sirup

Hours Stored	Sirup Concentration and Grams of Fruit 20	40	50	60
0	500	474	498	502
1	443	417	434	409
3	439	408	415	420
5	438	400	408	404
16	434	377	375	366
21	432	368	365	352
28	428	360	350	333

than in the sugar pack and that this loss increases with an increase in sugar concentration or with an increase in the ratio of sugar to fruit.

A comparison of Table II with similar results in Table VIII, as well as similar results obtained with berries, shows that the osmotic action of the sugar often plays as important a rôle in the extraction of fruit juice as does injury to texture on freezing.

The rate of loss of weight in cling peaches hand peeled and stored at room temperature is shown in Table VIII. Discrepancies in the table are due to sirup clinging to drained fruit when weighed.

Although the chief action of sirup lies in extracting juice from the fruit, preliminary tests have shown that the fruit actually absorbs some of the sugar. Diehl, in his preliminary report, did not find this to be the case in sugar-packed berries, but he has recently stated in a personal communication that later investigations have proved it to be true. Apparently, then, there is some justification for the widespread view of packers in the Pacific Northwest that "sugar curing" occurs in barreled berries, to supplement the preservative action of the freezing itself.

As it is desirable to cover the fruit completely with sirup, the most satisfactory proportion of sirup to fruit cannot be definitely established. This ratio will depend upon the size and variety of the fruit as well as on the size of the container and the compactness with which the fruit is packed.

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How to Increase Life and Efficiency of Belting

Close attention to a few simple rules for the selection, operation and maintenance of leather belts assures the efficient functioning of belt-driven equipment and safeguards the plant against lost time caused by excessive belt repairs

By ARTHUR R. GLITHERO
London, England

WHILE a great deal of time may be devoted to the care and upkeep of the power plant in a food factory, scant attention often is paid to the belting used for transmitting the power from the prime mover to the driven machines. It seems to be taken for granted that the belt needs no attention and can well look after itself. Belting cost is no mean item in the overhead expenses and to neglect it results in a twofold loss: waste of power due to the inefficiency of the belts, and increased cost due to frequent renewals.

One of the most important factors in the use of belting for power transmission is the elasticity or life of the belt. The first consideration in good leather belting is the hide. The best quality is made from the prime or butt part of the ox-hide covering the back bone, and there is little or no stretch with it. Of course, the most perfect hide can be ruined by careless manufacture, and for this reason alone it is advisable to deal only with a firm that has a reputation and manufactures under registered trademarks.

As long as the original condition of the belting is maintained the best is being got out of it, but lack of attention soon brings about deterioration. Therefore belting economy does not end with the purchasing of even good belts. It becomes necessary to inspect them frequently to see that they are intact and to dress them occasionally, the object of belt dressing being to increase the coefficient of friction of a belt, thus enabling it to pull a heavier load with a given tension; such tension also acts as a preservative.

Generally speaking, a belt should be cleaned and greased every six months, but should belt slippage occur, perhaps through overload, dressing may be applied sparingly to enable it to continue to pull its load until such time as the machine can be shut down and the belt tightened. Care must naturally be exercised in tightening up, as the evils of over-tight belts are far reaching—increased friction on bearings, overheating shafting drawn out of alignment, or overstretching the belt, to mention but a few.

It must be remembered that the grease in a new belt becomes exhausted after a time as the result of heat, friction and atmospheric conditions and it therefore becomes essential to apply additional grease to keep the belt soft and pliable. Before applying the dressing the belt must be thoroughly cleaned of all accumulations of dirt and grease. This can be done with a stiff brush and then wiping it with a cloth moistened with kerosene.

Such preparations as castor oil, resin and other vegetable substances have been condemned by experts who have studied the question because they contain certain acid properties which eventually take the "life" out of the belt. Pure beef tallow may be used but there are several good and reliable dressings to be obtained from manufacturers who have devoted their energies to the production of a high-class material. Here again, however, the user must be warned against purchasing dressings from firms other than those with good repute. The dressings should be applied to the inner face of the belt, and while the belt may slip more at first, as the leather absorbs the grease the belt will swell in thickness and contract in length, and thus ultimately cling closely to the face of the pulley. While a belt should never be allowed to become dry, hard or stiff the too liberal use of dressings shortens the life of a belt.

The life of a belt may be increased by occasional washing and brushing in warm water and afterward greasing and thoroughly drying it. With care, a good belt will last from ten to twelve years, if neglected it may be useless after three or four years. In the event of a belt becoming saturated with lubricating oil it should first be cleaned by scraping with a wooden scraper, and then packed in sawdust or other absorbent for a few days. Another method is to pass the belt between rolls, under pressure, thereby squeezing out the oil, which can be absorbed by powdered chalk.

Opinion differs somewhat as to which side of the belt should be run next to the pulley face, the grain or the flesh side. In the case of a good belt, the grain side should transmit nearly twice the power conveyed by the flesh side. One disadvantage of using the flesh side next to the pulley is that whenever slip begins the strength of the belt gets ground away by the quicker running pulley acting like a grindstone. By running the grain side next to the pulley face the essential sinews and muscles on the flesh side are preserved, while the less important and harder grain side takes the wear and tear caused by belt slip.

THE PRACTICE of fixing wood or iron guides against the edge of the belt where it tends to leave the pulley is not to be recommended. If the belt will not maintain its proper position the remedy is not to force it to do so in the way indicated. The trouble usually can be traced to bad alignment or bad joints. The latter is among the most common faults in belt transmission work. How can a belt be expected to run straight if the joint is not made square? Great care must be taken, therefore, in cutting the ends to insure straight running.

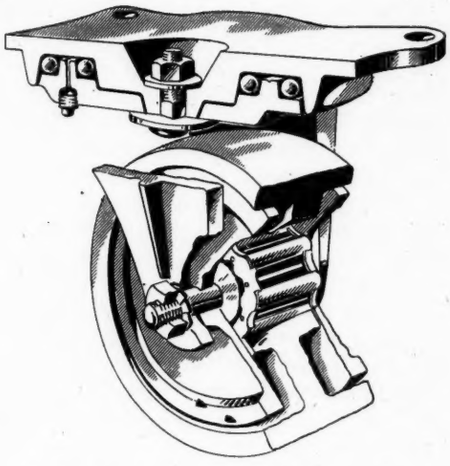
It sometimes happens that through the introduction of additional plant an existing main or auxiliary belt is found to be too narrow to convey the necessary amount of power and it slips, comes off, and breaks continuously. Obviously the remedy is to provide a wider belt. The pulley, however, may not be wide enough to allow of this, but it is well worth while to fit new pulleys with wider rims. It is not advisable to provide auxiliary pulleys and a second belt. The running is seldom found to be good, and the wear on the belts is heavy.

Occasionally the layout is of such a nature that it is found to be impossible to provide wider pulleys or even as a last resort to provide additional ones. In this event the alternative is to provide another belt and fix it on top of the first so that one is running inside the other. Probably the effect will not be actually double the driving power but it may be relied on to increase it very considerably.

Fig. 1—Raw materials are weighed in a centralized weighing department where equipment is mounted on wheels or casters

Putting EQUIPMENT ON WHEELS

To Give Flexibility



Roller-bearing casters with ball-bearing swivel tops are used to give mobility to heavier equipment

By EARL B. COX
President, Cox Baking Company, Jamaica, N. Y.

A PLANT with all possible units of equipment on casters or wheels, so that they could be moved anywhere they were needed, or could be lined up in any desirable combination, was the fundamental idea when we designed our plant at Jamaica. Such a plan of mobile mounting has many advantages besides those of convenience in arranging a setup for any kind of work to be put through the shop. For example, when we want to clean the floors the machines are all pushed to one side, a feature that greatly facilitates the operation; or whenever a piece of equipment is out of repair it is quickly replaced by another in good order. The machine that is down is wheeled out of the way until put in condition to take its place in the line again.

Still another advantage of having all the equipment mounted on casters is that of avoiding duplication of equipment. The flexibility which is obtained enables us to get the maximum use from every piece of equipment, and to push it aside when it is not needed. By this means we are able to get a higher production per square foot of floor space than would be possible were every unit bolted to the floor in a fixed position.

When it was once decided to make mobile all the equipment in the plant we were about to construct, it was necessary, of course, to provide the proper facilities for this mobility. Floors had to be smooth and as nearly level as possible, while still permitting good drainage. Thresholds, steps, or any other irregularities in surface had to be avoided by careful planning. It was impracticable, of course, to mount the milk pasteurizer, cooling coils, and glass-lined holding tanks on casters, because of the many and varied pipe-line connections. The ovens were far too heavy to be placed on casters, and nothing could be gained by mobilizing them. The mixers, also, were left stationary, for much the same reasons. But containers for raw materials, weighing scales, racks for handling the different types of pans through the various processes, mixer bowls, depositors for weighing out the dough, icing machines, decorating tables, cutting and wrapping machines, wrapping and packing tables, and shipping-room bins were all mounted on casters.

Although the business of the company has increased steadily since the original plant was built, less than five years ago, to the point where the floor space has been

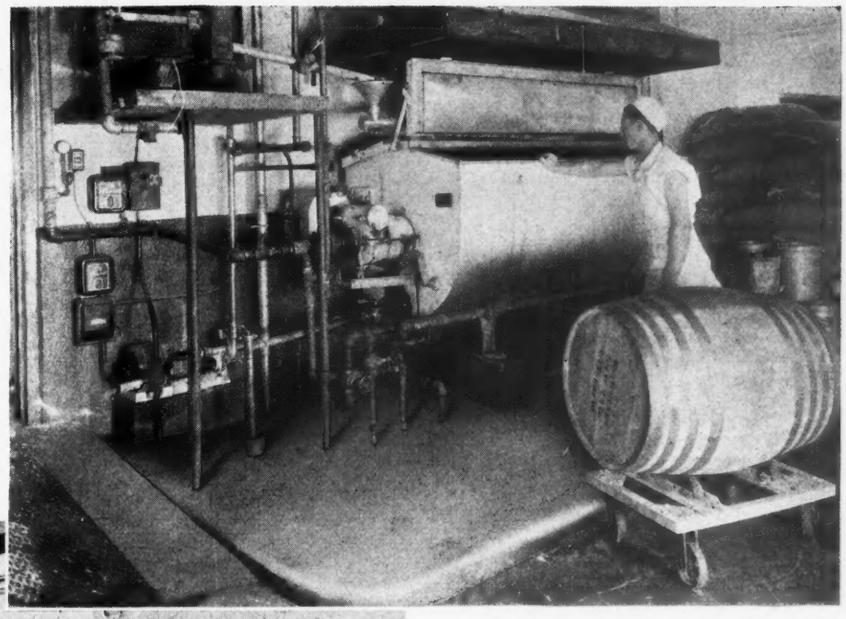


Fig. 2—Milk used in the cake products is pumped into the twin-coil pasteurizer from barrels mounted on wheeled trucks

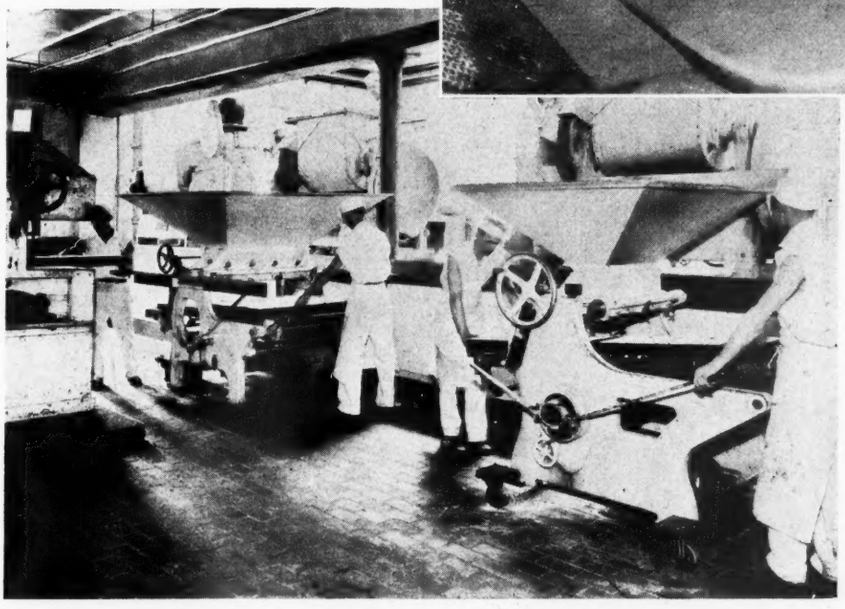


Fig. 3—Specially designed caster mounts make depositors flexible for use in relation to mixers and ovens

increased from 23,000 sq.ft. to 80,000 sq.ft., the plan of using mobile equipment has continued to prove satisfactory. If we had changed over to stationary equipment, we estimate that the floor space necessary to give the present production would have been 50 per cent greater in the bakeshop alone; and if we consider the remainder of the plant, excluding the bakeshop, the space required would have been 7 per cent greater.

To obtain this flexibility it was necessary to plan carefully in advance of actual construction, so that floors would not only be smooth and nearly level but that the clear floor areas would be of sufficient size to utilize the mobility to the fullest extent. Floor-supporting columns were placed 25x35 ft. in the basement and 50x35 ft. above the first floor, thus making very large bays. All floors slope gradually toward the centers of the bays and give good drainage, but the slope is not great enough to cause the caster-mounted machinery to shift of its own weight. The actual slope is 0.16 in. per foot.

Floor surfaces are smooth concrete in the shipping and receiving departments, which are located on the ground floor, and in the cooler and storage area for raw materials, situated in the basement. Tile brick, such as is used in packing plants, constitutes the floor on the cake-mixing platform and in the baking room on the second floor. In the cake cooling, decorating, and packing departments on the second floor; and in the cookie and the icing departments, on the third floor, 2½-in. hexagonal tile is used.

These various types of floors were chosen for the respective departments because concrete, which is relatively cheap in the matter of raw materials and installation, will not withstand the wear and tear of the great amount of trucking done in the plant above the ground floor. Even if it did not actually crack and chip, it would dust too freely for our use. The use of the vitrified tile brick seemed advisable in the cake-mixing department and in the bakeshop because of the heavy service that is imposed upon those floors. We feel that we chose correctly. Although the hexagonal tile has been quite satisfactory where used, it probably would have cracked and loosened from its bed if subjected to severe usage.

The caster shown on page 354 is the one selected for our use. We selected this type of caster because it has durability, ease of operation, resistance to picking up strings and the like, and is adaptable to many types of equipment.

In most cases the casters were screwed or bolted directly on the legs or base frames, but in the case of the

Fig. 4—Caster mounted icing equipment permits quick and easy shifting for cleaning up and for desired combinations

Fig. 5—Heavy tables are mounted on casters, so that they may be used individually or in combinations for wrapping, packing, or conveying purposes

Fig. 6—Small, light tables can be easily shifted, without aid of casters, and combined with heavy tables for packing operations

wrapping and depositing machines a specially designed base had to be provided, as shown in Fig. 3. The weight of these machines made necessary the use of heavy-duty casters. If these casters had been attached to a platform base in the regular way, the machine would have been too high for economical operation. Some of the smaller machines were set directly on caster-mounted platforms.

Supplementing the use of casters, additional mobility in the plant was gained by the use of wooden flats or skids 4x3 ft. with a capacity of 21 bags of flour of 140 lb. each. They simplify receiving and transferring of such raw materials as flour, sugar, fruit, nuts, and the like, and such packaging supplies as wrappers, folding boxes, and corrugated cartons.

The operating steps for making sponge cake illustrate admirably how completely our production department moves on casters or wheels. In appropriate metal containers, which serve as temporary storage receptacles, blended flour and powdered sugar are wheeled to the centralized weighing department. A "Weightograph" platform scale, mounted at a convenient height on a base equipped with casters, is used to weigh the dry ingredients into batch-lot containers. The eight rectangular pans into which the ingredients for two batches of sponge cake are weighed for transfer to the mixing department, fit on a shelved, steel-framed truck 3 ft. 9 in. long, 2 ft. 3 in. wide, and 4 ft. high, equipped with four ball-bearing swivel casters, 5 in. in diameter and $1\frac{5}{8}$ in. wide.

The mixers are situated on an elevation midway between the second and third floors, across one end of the cake bakeshop. This arrangement permits the fully mixed dough to be emptied directly into variable-speed

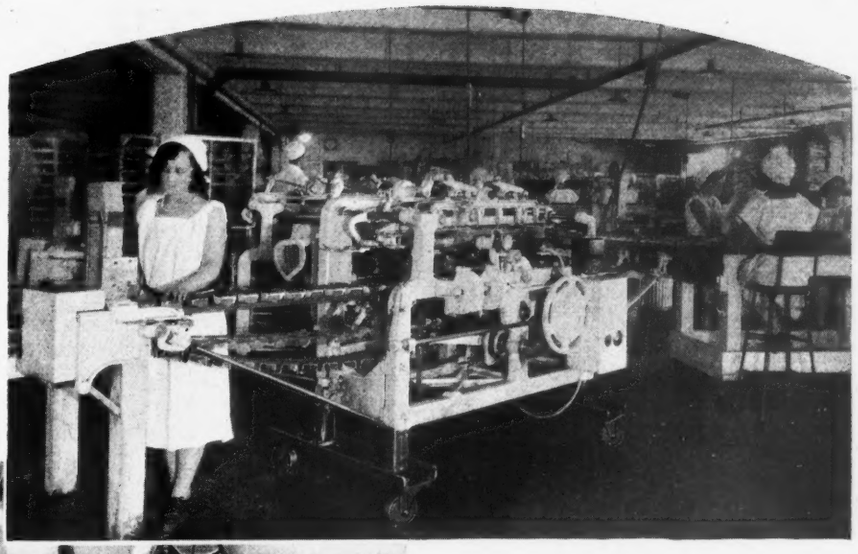


Fig. 7 — Caster-mounted wrapping machines permit quick replacement in case of breakdown or change in type of product to be wrapped

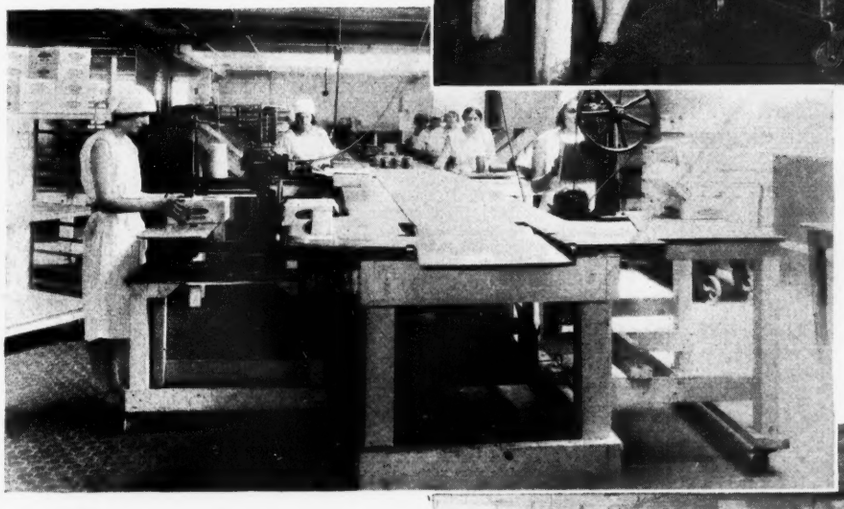


Fig. 8 — Caster-mounted equipment facilitates assembly of packing tables and box stitching and tying machines in the cookie department

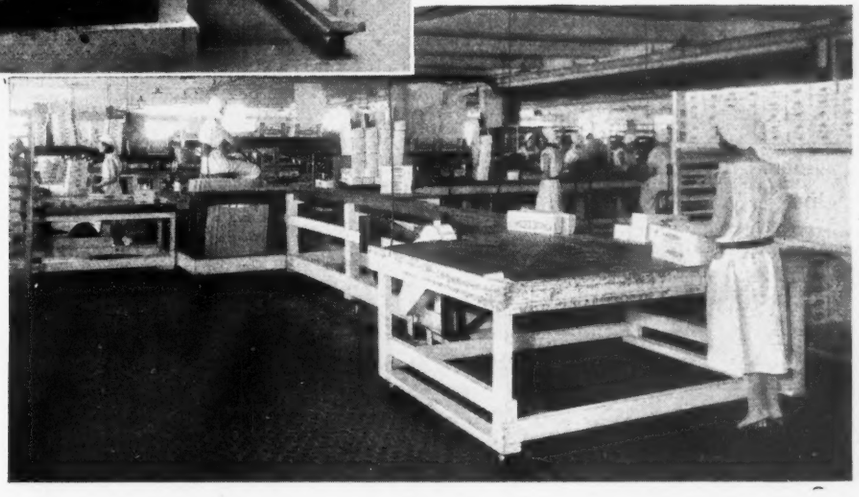


Fig. 9—Caster-mounted conveyors effect delivery of packaged products to a central point where they are loaded into bins on casters for transfer to the shipping department

depositors. These depositors are fitted with a specially designed base, mounted on casters, so that the proper depositor for each type of cake can be readily shifted into position for use with either of the four mixers, or, in the case of some types of cakes, for direct feed into an adjoining oven.

As each type of cake has its own size and style of pan, corresponding racks are required for handling these pans. The empty racks are so routed in reference to the cake pans for which they are designed that a sufficient number of the racks are in position to receive the cakes as they are taken from the oven and to transport them to the adjoining cooling room.

When the cakes have been cooled, they are transferred from the baking pans to flat metal trays. The racks of empty baking pans are sent back to the bakeshop. The racks of cooled cakes on trays are wheeled to the icing machines or decorating tables, if the cakes are to be iced or decorated. These units also are on casters and are capable of being moved to operate independently or in conjunction with other equipment.

Cakes that are ready for packaging are wheeled directly to the wrapping or cutting and wrapping machines, which are on casters, to be put in glassine or cellophane wrappers, and then boxed from packing tables, also on casters. The boxes of cakes are carried by horizontal conveyors which are mounted on casters, to a point near the express freight elevator. At this point they are stacked on wheeled metal bins and sent to the shipping department, where they are apportioned to designated wheeled trucks containing orders for the route automobile trucks.

The Wholesale F

Inseparable Fr

FREQUENTLY talked about, written about, wrangled over, the problem of food distribution apparently offers no new angle from which to attempt a discussion; yet, that very fact probably more than any other, is the reason why we witness today a growing tendency toward theorizing and an increasing disregard of the fundamental factors that are really involved. For instance, a prominent analyst has boldly proclaimed that this country pays a bill of four billion dollars annually for wastefulness in its distribution systems. If, however, we analyze that indictment, we must inevitably dismiss it for lack of evidence.

An estimate of the volume of retail business of the nation, based upon the Distribution Survey of eleven cities, places the figure at 53 billion dollars, and of that the nation's food bill accounts for 15¼ billion dollars, or 28.51 per cent. It follows that approximately the same percentage would represent the share that the food industries of the country presumably have in building up that 4 billion dollar wastefulness account, so that actually the food industry stands accused of wasting 1.14 billion dollars annually in distribution practices. This represents 7.5 per cent of its estimated gross sales volume.

In 1929, Swift & Company earned 1.31 per cent on its total sales. The Great Atlantic & Pacific Tea Company, with over one billion dollars worth of sales, earned slightly over 3 per cent. If this claim of wastefulness even approached the truth, at least in averages, it would indicate that Swift could increase its profits sixfold and the A. & P. two and one-half times, by application of proper economies in distribution. Anyone having a speaking acquaintance with the manner in which those two concerns are managed will readily admit that it would be impossible to effect such multiplication of earnings through any economies that might be effected in their methods of distribution.

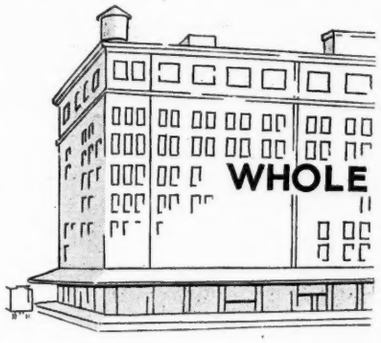
Obviously the analyst is wide of the mark, at least in so far as the food industry is concerned.

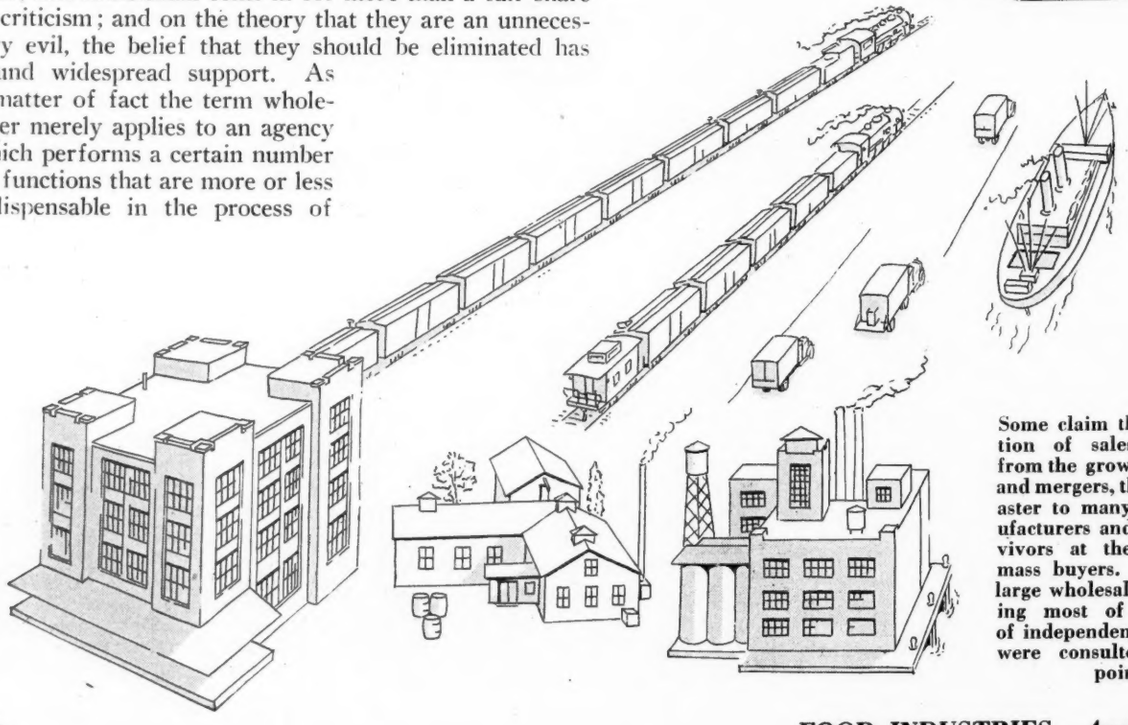
Whenever distribution is discussed, the jobber, wholesaler, and middleman come in for more than a fair share of criticism; and on the theory that they are an unnecessary evil, the belief that they should be eliminated has found widespread support. As a matter of fact the term wholesaler merely applies to an agency which performs a certain number of functions that are more or less indispensable in the process of getting goods from producers to consumers. Elimination of that agency alone can effect but slight economies unless a way also is found to make certain that the functions it now performs also are eliminated.

We, therefore, need a greater appreciation of the fact that, in the final analysis, the term distribution covers nothing more or less than a series of functions that vary in degree of importance and indispensability and are performed in a variety of ways with varying results of economy and efficiency by the several agencies involved in the process.

If the efficiency of the distribution system of the food industry is to be measured, we must take each step in the process and decide: first, whether it is indispensable and desirable, and (if found to be both), second, how well it is being performed in present-day practice. Only after all the steps in the process have been analyzed on that basis, will it be possible to determine where necessity stops and wastefulness begins.

The manufacturer of a food product knows better than anyone else the characteristics of his goods and the type of consumer to whom they will appeal most. It follows that it is he who must determine just which steps and functions are desirable and indispensable to insure the delivery of his





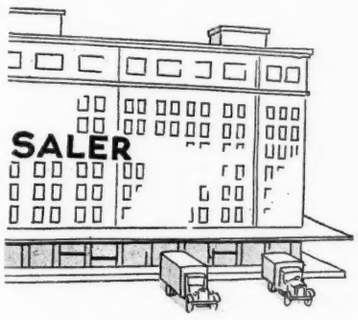
Some claim that constriction of sales, resulting from the growth of chains and mergers, threatens disaster to many food manufacturers and leaves survivors at the mercy of mass buyers. Small and large wholesalers, marketing most of the goods of independent producers, were consulted on this point

Function—
From Distribution

By O. FRED ROST

product into the hands of the ultimate user by the most practicable route and in prime condition. Also it is he who must consider the cost of performing those functions, for they have a direct influence on the price at which his goods will be offered for sale.

When determining how best to distribute his goods the manufacturer must first consider the question of perishability. It is quite conceivable that some of the products now handled through ordinary channels should, in the interest of efficiency and to prevent spoilage, eventually be distributed like Fleischmann's yeast. In fact, for many years a considerable volume of mayonnaise, pickles, catsups, etc., have thus gone from the producer direct to the retailer. However, there is nothing on record to prove that the elimination of the wholesaler, thus automatically effected, has resulted in any saving, because the more expensive "wagon" type of distribution absorbs the larger part of the differential with which the average wholesaler must be satisfied today. Also it does not necessarily follow that the direct-to-the-retailer method of distribution could effect many practical benefits, and possibly economies, if employed in the distribution of canned goods, for instance, or that multiplicity of other non-perishable items that go to make up the bulk of the warehouse stock of the average wholesaler.

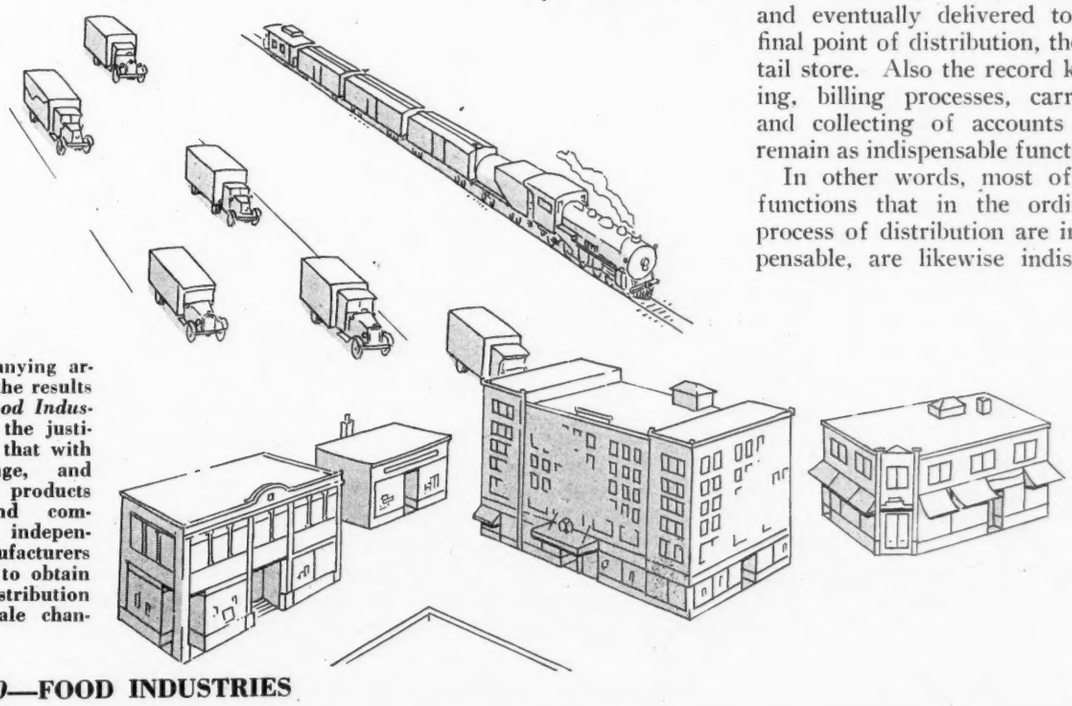


Nor is it at all certain that the producer-to-retailer route of distribution can be employed to any considerable extent in that new branch of the food industry: the quick-frozen foods. Here perishability is a dominant factor. The economies effected by that method of food preservation can accrue only when the processing plant is in closest proximity to the source of the fresh produce and therefore the problem of distribution after preservation is almost a greater one than in any other line. Obviously, stocks of quick-frozen foods must be kept in their frozen state while transported to and stored at many points for distribution to the retailer when wanted. That calls for the usual functions of a wholesaler, and no matter by whom they may be performed their cost will be included in the retail price and the ultimate consumer will have to pay for them.

In the line of meats and animal products, distribution as such demands today practically the same procession of functions that were employed many years ago. The fact that the wholesaler as such has faded out of the picture at many points has had no visible effect on the price that the ultimate consumer pays, for the simple reason that his going did not shorten the route of travel but merely shifted the responsibility of performing the various indispensable functions from one agency to another.

We in the food industry have witnessed a growing trend toward so-called horizontal mergers. These are heralded as a definite means for effecting important economies in the distribution of the various products that they bring under one control. However, so far this theory still must prove itself in actual practice, for in the final analysis a horizontal merger merely produces a super manufacturer and a super wholesaler. Obviously, the goods they produce must still be transported from the place of manufacture to the various points of distribution. They must be trucked into warehouses, stored, rehandled, and eventually delivered to the final point of distribution, the retail store. Also the record keeping, billing processes, carrying and collecting of accounts still remain as indispensable functions.

In other words, most of the functions that in the ordinary process of distribution are indispensable, are likewise indispen-



In the accompanying article, based on the results of its study, *Food Industries* sets forth the justified conclusion that with quality, package, and price of their products comparable and competitive, most independent food manufacturers should be able to obtain satisfactory distribution through wholesale channels

sable under the plan of mass distribution typified by the horizontal merger. So it seems that the major benefits that may be expected to accrue to organized concentration of distribution under a single staff must come as the result of handling large volume sales. However, those benefits can be retained only to the degree in which they are not offset by the greater amount of leakage and inefficiency that so often creeps into large-scale operations.

CHAIN stores are credited with having reduced distribution cost and, correspondingly, the cost of living. It would be impossible to treat fully so important a subject within the confines of this article, and so it must suffice to state that whatever reduction in distribution costs has been effected through chain distribution, did not result from the elimination of functions.

This brief review of some of the important new phases in the field of food distribution seems to immediately warrant the conclusion that the revolutionary movement that we have witnessed during the last decade actually was a prolonged process of refinement of functions rather than one of elimination. From this process the food industry will emerge with two major benefits definitely achieved:

1. Indispensable functions will be performed by the agency that does so at the least cost, regardless of who it may be.

2. Each unit that is engaged in one branch or the other of the food industry will perform with unprecedented efficiency and economy.

It follows quite logically that the wholesaler who wishes to survive this relentless process of refinement must keep abreast of current trends and developments. The manufacturer of today has grown intensely critical of all influences or factors that directly or indirectly affect the price that the ultimate consumer must pay for his product.

Similarly, the independent retailer no longer looks merely at the price of the article that the wholesaler offers to sell him, but he inquires quite frankly as to just what that wholesaler is doing to help him, the retailer, meet the competition with which he finds himself surrounded.

As a result of this two-sided pressure for greater usefulness, better service, and higher efficiency we find that the plow-horse type of wholesaler who considered himself a fixture has dropped out because he could not stand the pace, and the wholesaler who has survived into 1930 is wide awake, energetic, able to jump most of the hurdles that modern competition can devise for him.

There are many wholesalers who today are performing all the functions of their job at less than it costs the larger chain store to do the same job—and they are making a profit.

A large wholesaler in an Eastern city makes a special study of the particular competition that each of his customers has to meet and then provides them with goods at a price that will enable them to meet that price competition in the form of weekly specials. Window trimming, placards, store display—all are part of the service that this wholesaler gives to his retail customers.

In a Southern city, a wide-awake wholesaler actually does business at a cost of 6 per cent, or 1½ per cent less than what someone wants us to believe is being wasted in food distribution. This wholesaler buys for cash, handles few if any parallel lines, does business within a small radius of miles from his warehouse, and only with customers who pay cash. He has no salesmen on his staff, but the volume of his billings for goods that his customers buy from him is growing by leaps and bounds, in spite of the fact that they know that he insists on making 2 per cent clear profit on every transaction.

Another wholesaler has put into operation a plan of merchandising that enables his customers to meet all the demands of their particular competition. He operates his plan through a corps of well-trained salesmen; he uses the well-advertised goods as effectively as any chain organization, and then provides his customers with a "fighting line" of goods carrying a private brand, that are of excellent quality and also sufficiently low in price. Special sales on these are conducted on a well-defined schedule, and tied in with current advertising of nationally known brands. Added to all this, he stimulates and cultivates the individual initiative of his customers in many and varied ways.

Wholesalers of the type represented by these examples are available in most of the important distribution centers of the United States. Naturally, some of them have advanced further than others in adjusting their methods and sales-building efforts to the trend of the times. Unquestionably, the wholesaling branch of the food industry is rapidly emerging from the painful and, at times, cruel process of refinement that its former inefficiency made inevitable. It has been substantially purged of the wastefulness with which it performed its traditional functions of distribution.

There can no longer be any doubt but that manufacturers, particularly those who are interested in preserving their independence, will find increasingly effective distribution through the modern wholesaler. Similarly, the independent food retailer today finds the wholesaler more essential to the successful operation of his business than he has ever been before. The average retailer who has survived the onslaught of high-power competitors does not hesitate to admit that it was the support and co-operation of the wholesaler that made it possible for him to do so.

IN MANY territories, the sales-building services of the various wholesalers have gradually produced groups of retailers who buy practically everything from the one wholesale house. Instead of interviewing 15 or 20 salesmen per week, these retailers interview but one or two. The sales-producing capacity of wholesale salesmen is greatly increased by concentration on a lesser number of customers, while retailers find it to their distinct advantage to place worth-while orders at regular intervals with one house, rather than a large number of small orders with many houses.

Through stricter methods of credit control, more rigid supervision of accounts, prompt and decisive action regarding delinquents, the wholesalers have helped to eliminate inefficient retailers, and made possible more effective co-operation with those retailers who are performing their task on an up-to-date merchandising basis.

Analyzing the average wholesaler as he is functioning in 1930, we find that he is doing a two-fisted job with steadily growing effectiveness. He provides the manufacturer with centralized means for definite distribution of his products in a given territory and at the same time "mothers" and builds the retail outlets through which those products must reach the consumer. Therefore, as long as the functions performed by the wholesaler remain indispensable, so long will his highly specialized service and his knowledge of local conditions and territory and the particular requirements of that market prove indispensable to many manufacturers.

FORMS OF MILK AVAILABLE

For Food Manufacturers

By F. L. SEYMOUR-JONES
Chemical Engineer, The Borden Company, New York, N. Y.

TO SOME EXTENT the food industries make a living by taking in each other's washing. The miller starts with grain as his raw material and ends up with flour as the finished product. To the baker, flour is a raw material. So it is with milk products, used in ever-increasing quantities by bakers, ice cream manufacturers, chocolate workers, and candy makers. The dairy industry has developed milk in many forms and those who buy it have a wide choice from which to select.

Some of the forms in which milk is available are shown in Table II. The average composition is given, but this will vary considerably in some cases and it pays to analyze the material, at least for fat and total solids. The advantages and disadvantages of each kind are not discussed here, as the consumer can make his choice readily, depending on what he wants to use the milk in and how he is going to use it.

Fluid milk varies considerably in its fat and solids content. Variations due to the individual cow may be neglected, since the manufacturing consumer usually gets mixed-herd milk. However, there are two principal variations he will meet. The first is due to breed, the fat (and solids) content increasing in this order: Holstein, Shorthorn, Ayrshire, Guernsey, and Jersey. Broadly speaking, Holstein is the predominating breed of the East and Middle West, and Jersey of the South. The second is the matter of season.

Commonly, milk is richest in fat in the late fall and poorest in late spring. Skimmed milk, of course, will vary in fat according to the degree of skimming. Because milk and cream are bought and sold on the basis of fat content, the dairyman naturally separates his milk as closely as possible. The skim solids content will be similar to that of the milk whence it is derived, allowing for the removal of fat.

Both milk and skim milk are available in plain concentrated form. This merely involves the removal of water. While the heat treatment they get in processing pasteurizes them, no preservative is added and they are not sterile. Consequently, refrigeration is necessary if they are to be kept any length of time. Whole milk usually is concentrated in the ratio of two or three to one, skim milk at three or four to one, though almost any desired concentration up to around 60 per cent solids can be obtained. Sometimes, when a thicker body is desired, the concentrated milk is superheated with steam to thicken it.

Table I—Milk Equivalents

1 lb. bulk concentrated milk	=	2 to 3 lb. fluid milk
1 lb. bulk concentrated skim milk*	=	3 to 4 lb. fluid skim milk
1 lb. sweetened-condensed milk	=	2.33 lb. fluid milk
1 lb. sweetened-condensed milk	=	2.75 to 3.25 lb. fluid skim milk
1 lb. evaporated milk	=	2.25 lb. fluid milk
1 lb. dry milk	=	8 lb. fluid milk
1 lb. dry skim milk	=	10 lb. fluid skim milk
1 lb. dry cream (72 per cent fat)	=	4 lb. 18 per cent cream
1 lb. fluid skim milk plus 0.67 oz. sweet butter	=	1 lb. fluid milk
1 lb. dry skim milk plus 7.5 oz. sweet butter	=	11 lb. fluid milk
1 lb. sweetened-condensed skim milk plus 2 oz. sweet butter	=	3.25 lb. fluid milk plus 0.4 lb. sugar

For sweetened-condensed, evaporated, and dried milk the federal government has established certain standards for fat and solids content. Sweetened-condensed and evaporated milk tend to approximate these fairly closely. This insures a uniform product and also permits the manufacturer to get the right body in his product at all seasons. Sweetened-condensed milk contains added sugar, which preserves the milk, while evaporated milk is preserved by sterilization in the sealed can. The standard for sweetened-condensed skim was lowered about two years ago from a minimum of 28 per cent milk solids to 24 per cent milk solids. However, quotations are still made largely on the old basis. Roughly speaking, 1 lb. of sweetened-condensed milk is equivalent to 2.33 lb. fluid milk plus 0.4 lb. sugar, while 1 lb. of evaporated milk equals 2.25 lb. of fluid milk. One pound of sweetened-condensed skim milk is equivalent, on the higher solids basis, to a little better than 3 lb. of fluid skim plus 0.4 lb. sugar.

Table II—Average Composition of Milk Products

Product	Milk Fat Per Cent	Milk Solids Not Fat Per Cent	Sugar Per Cent	Total Solids Per Cent	Water Per Cent
Fluid Milk	3.0–5.0	8.5–9.0	0	12–14	86–88
Fluid Skim Milk	0.1	8.5–9.0	0	8.6–9.1	91–91.5
Bulk Concentrated Milk Ratio 2:1 or 3:1	7.0 –12.0	17–27	0	24–39	61–76
Bulk Concentrated Skim Milk Ratio 3:1 or 4:1	0.3–0.4	26–36	0	27–37	63–73
Sweetened-Condensed Milk	8.1	20.1	44.0	72.2	27.8
Sweetened-Condensed Skim Milk	0.3	23.8 –27.8	42.0 –42.2	68.0 –70.1	29.9 –32.0
Evaporated Milk	7.9	18.0	0	25.9	74
Dry Whole Milk	27.5	70.5	0	98.0	2.0
Dry Skim Milk	1.0	96.5	0	97.5	2.5
Dry Cream	72.0	17.0	0	99.0	1.0
Butter (Sweet)	83.5	1.3	0	84.8	15.2
Butter (Salt)	80.5	1.0	0	84.5	15.5*

*3 per cent salt

While government standards permit up to 5 per cent moisture in dried milk, it is necessary to go well below this if the product is to keep. Dried whole milk represents an eight to one concentration, dried skim milk about ten or eleven to one, and dried cream about four to one. Sometimes these are used in further manufacture just as they are, mixing in the dry state. In other applications, they give better results when redissolved in water, and solubility then becomes of decided importance.

Butter represents essentially the fat of milk together with a little milk solids not fat, water, and maybe salt. Combined with skim milk, dried or condensed, it gives the complete milk solids again and may sometimes be legally so used, as in the baking of milk bread.

There are certain milk products not mentioned above, since they do not so often enter into the manufacture of further food products, at least not interchangeably with fluid milk. These include malted milk, casein, butter oil, milk sugar, buttermilk—dried, concentrated, or fluid—and cheese.

CANNING

White Potatoes

Southern Potato Products Company
Palatka, Fla.

Keystone View Company Photographs

Fig. 1—Small, or No. 3, potatoes, which formerly had no market, are held in these bins of 500-bbl. total capacity. By raising the slides the potatoes fall onto woven-wire conveyors that move them through pressure sprays and dump them into the hopper in the center. From this point they are elevated by an inclined conveyor to the peeling machines in Fig. 2

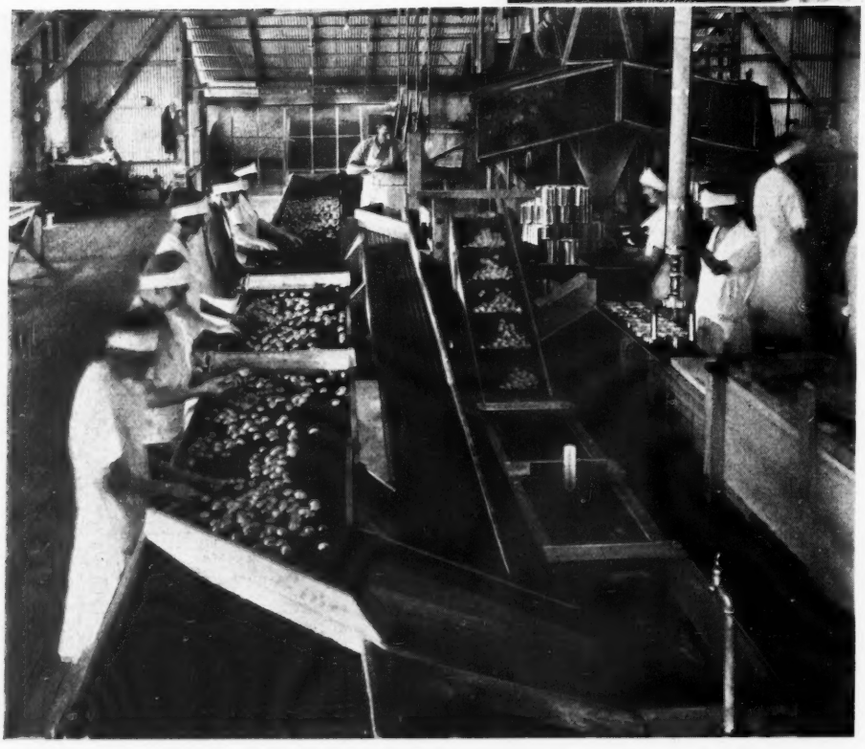


Fig. 2—Four of the battery of eight peeling machines driven from shafts through the floor. They operate on the principle of the well-known types of peeling machines but are made of wood, lined with fiber matting instead of the customary abrasives. Peeled potatoes are discharged onto the inspection belt

Fig. 3—After inspecting and trimming the peeled potatoes they pass through a hot-water bath for blanching and thence to filling station. Filling is done by hand with a wooden hoe. The operator holding the valve is filling the interstices in the cans with hot water. The next step is that of passing the filled cans through the steam "exhaust" box on the right to preheat the contents before closing the cans

Fig. 4—Cans emerging from exhaust box and moving to the closing machine feed disk

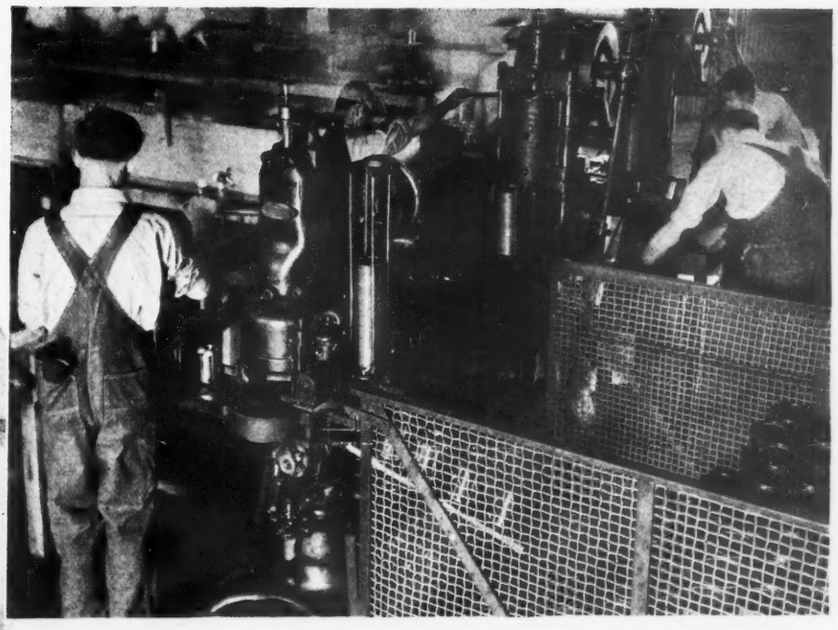
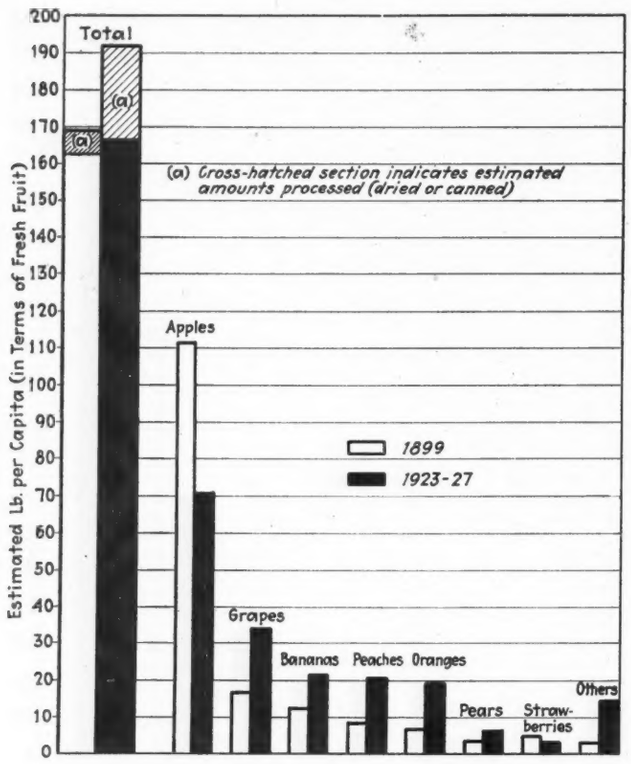


Fig. 5—Putting the lids on the cans by a double-seaming operation. The closed cans are stacked into the wire crates at the right, preparatory to processing

Fig. 6—Loading the retorts for sterilizing the cans by heat. This form of retort is something new to the canning industry and was developed by the company to meet the particular problem

Fig. 7—Setting the automatic time alarm that rings a bell when the process of sterilization is complete. Recording instruments keep track of the temperature. Pressure is automatically controlled by an inverted-type governor barely visible at the extreme right. Steam pipes are above and water pipes for cooling the cans in the retorts after processing are below. The man who laid out this plant believed in convenience



Changes in per capita consumption of various fresh fruits

Major Trends in Consumption of FRUITS AND VEGETABLES

By E. G. MONTGOMERY
Chief, Foodstuffs Division,
U. S. Department of Commerce

FRUITS and vegetables form two of the most important, and yet most uncertain and variable, factors in the American diet. That there have been changes in our habits of consumption of these two food groups is well known, but exact data to show the speed and magnitude of the changes are all too few.

From 25 to 30 fruits and berries are on the market, but many of these are of minor importance, and little or no statistical information about their production is available, particularly for 30 years ago. For the twelve fruits which constitute the bulk of consumption, however, figures have been compiled for the past 30 years. Even for these twelve, only the "commercial crop" figures are available, with the exception of apples, for which we have an estimate of the total crop. In recent years, this "commercial crop" has represented a fairly high proportion of the total. Thirty years ago a much higher proportion of such products as strawberries, peaches, and pears, was consumed locally and not included in the "commercial crop." On the other hand, citrus fruits, cranberries, and a large part of the grapes have always been a "commercial crop," and the figures for the past 30 years represent almost the total production.

The statistics available for commercial production of vegetables would indicate a per capita consumption of about 300 lb. gross weight, of which about 40 lb. is canned and about 260 lb. is consumed fresh. On the average, about 180 lb. of this is made up of potatoes, indicating a consumption of about 80 lb. of other kinds of vegetables. Of course, there should, if possible, be added to this commercial crop both the local production and the production of home gardens. These two, not included in commercial estimates, even today probably would add a considerable amount to the above figure.

Unfortunately, we are not able to make comparisons of vegetable consumption with the period of 30 years ago, as we have done with a number of other food commodities. The early official statistics are very incomplete on vegetable crops, due to the large untabulated "local" production in the vicinity of the larger cities and to crops produced in small commercial or home gardens throughout the country. During this period a great change has been taking place. The home garden and local production has been declining, and large-scale commercial production has been developing in localities where conditions are most favorable. This change has been helped by the development of refrigeration and improved transportation and distribution facilities. As a result, a larger part of our vegetable production is now on a commercial basis.

It would be interesting if we could study the shifts

Estimated Total Per Capita Consumption of Dried Fruits

Year	Production (Pounds)	Imports (Pounds)	Exports (Pounds)	Apparent Consumption (Pounds)	Population (000 Omitted)	Apparent Consumption Capita (Pounds)
1889	(a)	105,292,738	20,861,462	.....	.....	....
1899	84,737,900	75,719,733	65,580,938(c d e)	94,876,695	74,799	1.27
1909	485,335,800	78,424,623	141,488,618(c d e)	422,271,805	90,691	4.66
1919	615,408,528	78,699,119	291,534,110(c e)	402,573,537	105,003	3.83
1927	1,012,795,660(b)	83,914,155	489,579,172(c)	607,130,643	118,628	5.22

(a) Not listed separately.
(b) Preliminary figure.
(c) Includes Exports of Foreign Merchandise (re-exports).
(d) For fiscal year ending June 30 of following year.
(e) Does not include fruit listed under "all other" item for which only value is given.

Source: Production and Population figures from reports of the Bureau of the Census; Imports and Exports from "Foreign Commerce and Navigation of the United States."
Compiled by Statistical Section, Foodstuffs Division, Bureau of Foreign and Domestic Commerce.

in consumption which may have taken place as a result of new developments. It is believed by some that we have decreased the consumption of potatoes and made this up with a greater variety of fresh vegetables. Unfortunately, the statistical information available is not sufficiently complete to establish even this simple conjecture among the many interesting theories that have been brought forward. About the only general statement which it seems safe to make is that at least some of the commodities which are now produced throughout almost the whole year, such as green beans, green peas, and lettuce, must be consumed in larger quantity than they were when the season was short and production was largely of a local character.

Yearly consumption of the different fruits is quite variable, depending largely on the crop produced. For example, the 1926 apple crop was very large, but as it was apparently all consumed, the apparent disappearance that year was about 90 lb. per capita. The next year there was a very short crop and only about 41 lb. per capita was available. The production of citrus fruit, however, is much more stable and shows a fairly uniform consumption from year to year.

The most striking shift in consumption is the decline in apple consumption during 30 years from about 111 lb. to 71 lb. per capita, and the striking increase in the consumption of citrus fruit, peaches, and grapes. The consumption of citrus fruits has apparently increased about 20 lb.; grapes, about 17 lb.; and peaches, 12 lb. Of course, a large part of both grapes and peaches are processed and not consumed as fresh products. Grape-

FRESH FOODS, largely fruits and vegetables, form a large and vital part of the diet. Many of those interested in forecasting future food markets so that they may manufacture most profitably, should give almost as much attention to these commodities as to their own lines, for many fresh fruits and vegetables are highly competitive with, or in some cases important stimulants for, processed foods. Consider, in the latter class, salad vegetables, a vital factor in determining the consumption of mayonnaise, salad oils, and many condiments.

Mr. Montgomery here discusses the present status and trends in the per capita consumption of fruits and vegetables. A complete and comprehensive interpretation, unfortunately, is not feasible, because of lack of data. But there are sufficient facts to establish clearly certain trends. To mention but one, it appears that the entire increase in per capita consumption of fruits in the past 30 years has taken place because more fruits have been dried or canned. In a later article the status of canned fruits and vegetables will be reviewed in some detail.

Per Capita Consumption of Various Dried Fruits

Commodity		Production Pounds	Imports Pounds	Exports Pounds	Consumption Pounds	Population (000 Omitted)	Consumption per Capita — Pounds
Prunes	1921	(a)	.....	117,933,740	.....	108,445	....
	1923	245,786,104	.....	59,103,757	186,682,347	111,693	1.7
	1925	397,583,116	.....	146,484,934	251,098,182	115,378	2.2
	1927	438,885,640	.....	229,589,930	209,295,710	118,628	1.8
Raisins	1921	275,282,354	17,014,893	32,968,664	259,328,582	108,445	2.4
	1923	380,068,441	9,848,021	77,814,000	312,102,462	111,693	2.8
	1925	533,721,949	7,938,357	125,923,926	415,736,380	115,378	3.6
	1927	435,291,836	2,536,573	177,434,912	260,393,497	118,628	2.2
Apricots	1921	(a)	.....	(b)	.....	.....	....
	1923	54,029,242	.....	20,169,265	33,859,977	111,693	.30
	1925	33,039,015	.....	20,160,775	12,878,240	115,378	.11
	1927	36,754,815	.....	20,913,280	15,841,535	118,628	.13
Peaches	1921	35,406,706	.....	(b)	.....	.....	....
	1923	61,616,496	.....	4,655,852	56,960,644	111,693	.51
	1925	36,857,466	.....	4,412,232	32,445,234	115,378	.28
	1927	38,037,912	.....	6,516,966	31,520,946	118,628	.27
Apples	1921	22,975,189	.....	(b)	.....	.....	....
	1923	19,397,844	.....	16,707,765	.....	111,693	....
	1925	21,121,244*	.....	22,720,824	.....	115,378	....
	1927	22,252,515*	.....	27,663,994	.....	118,628	....
All other dried fruit	1921	24,986,000	.....	(b)	.....	.....	....
	1923	30,903,088	.....	12,206,268	.....	111,693	....
	1925	31,805,023	.....	12,005,645	.....	115,378	....
	1927	41,572,942	.....	19,570,640	.....	118,628	....
Currants	1923	.....	23,472,586	555,962(e)	22,916,624	111,693	.21
	1924	.....	13,964,934	307,415(e)	13,657,519	113,727	.12
	1925	.....	14,191,852	93,262(e)	14,098,590	115,378	.12
	1926	.....	13,315,596	39,027(e)	13,276,569	117,136	.11
	1927	.....	11,951,282	41,564(e)	11,909,718	118,628	.10
Dates	1923	.....	41,732,727	2,760,769(e)	38,971,958	111,693	.35
	1924	.....	63,606,863	5,421,124(e)	58,185,739	113,727	.51
	1925	.....	78,705,567	3,799,784(e)	74,905,783	115,378	.65
	1926	.....	49,279,895	4,275,727(e)	45,004,168	117,136	.38
	1927	.....	38,408,598	2,872,933(e)	35,535,665	118,628	.30
Figs	1924	(d) 17,000,000	42,464,895	738,368(e)	58,726,527	113,727	.52
	1925	19,200,000	46,572,230	2,554,630(e)	63,217,600	115,378	.55
	1926	22,800,000	43,661,774	1,581,545(e)	64,880,229	117,136	.55
	1927	24,000,000	31,017,702	4,899,349(e)	50,118,353	118,628	.42
	1928	20,000,000(f)	38,737,539	5,334,257(e)	53,403,282	120,013	.44

(a) Not comparable with figures for other years because of enlargement of scope of canvass; included in "all other dried fruit."
(b) Listed under "all other" and value only given.
(c) Comparable figures not available.
(d) These figures represent the California crop only. However, production of dried figs in other states is almost negligible.
(e) Figures for exports represent exports of imported merchandise (re-exports).
(f) Preliminary figure.

(*) Low production figures probably account for apparent indication that exports exceed total production.

Sources: Production figures from U. S. Bureau of the Census (except for figs which are from Crops and Markets), United States Department of Agriculture; imports and exports from Foreign Commerce and Navigation, United States Department of Commerce; per capita estimates by Statistical Section, Foodstuffs Division, Bureau of Foreign and Domestic Commerce.

Apparent Per Capita Consumption of Fresh and Canned Vegetables (Commercial Crop) for the Five Year Average 1923-27

Commodity	Total Fresh (Pounds)	Canned (Pounds)
Onions	10.48	....
Peppers	0.78 (a)	....
Cauliflower	1.14	....
Celery	4.27	....
Corn, sweet (canning)	11.62	4.3 (c)
Eggplant	.21 (a)	....
Carrots	2.29 (a)	....
Asparagus (table)	.58	....
Asparagus (canning)	.81	.55 (c)
Beans, snap (table)	1.22	....
Beans, snap (canning)	.83	....
Peas, green (table)	.73	....
Peas, green (canning)	3.42	3.9 (c)
Spinach (table)	1.18	....
Spinach (canning)	.82	.79 (c)
Cabbage (table)	15.75	....
Cabbage (for kraut)	2.32	.98 (c)
Tomatoes (table)	7.96	....
Tomatoes (for manufacturing)	21.74	7.4 (c)
Cucumbers (table)	2.13	....
Cucumbers (for manufacturing)	1.58	....
Sweet potatoes	37.22	.30 (e)
Potatoes	183	....
Beans, dried	8.6	....
Peas, dried	1.01 (b)	....
Lettuce	6.64 (heads)	....
Watermelons	.49	....
Cantaloupes	5.42	....
Tomato pulp	.....	.82 (c)
Tomato paste	.....	.27 (c)
Tomato sauce	.....	.06 (d)
Beans, with pork, with sauce or baked	.....	4.7 (c)
Beans, green, wax and others	.....	2.1 (d)
Beets	.....	.25 (c)
Pumpkin and squash	.....	.44 (d)
Hominy	.....	.52 (d)
Pimentos	.....	.10 (d)
Spaghetti	.....	.61 (d)
Total	.....	28.09

(a) Average 1924-27. (b) Average 1926-27. (c) Average 1923-25-27. (d) Average 1925 and 1927. (e) 1925 only.

fruit and pineapples are products that have come on the market principally in the last 25 years.

Apples were the principal fruit available during winter months 30 years ago. Since that time, citrus culture in Southern states, the development of winter fruits, such as berries, and improved transportation and distribution have made available a year-round variety of fruits in the Northern market. Also, the development of year-round supplies of fresh vegetables has undoubtedly lessened the demand for apples. The development of fruit canning also has no doubt had its effect in supplying the demand for fruit during winter months.

An estimate of the quantity of the twelve principal fruits which have been processed—that is, dried or canned—is shown at the bottom of the table. About 7 lb. was processed in 1899 and about 25 lb. is processed at present. When this is subtracted from the estimated disappearance of fresh fruit it shows a consumption of 162 lb. for 1899 and 166 lb. for recent years. In other words, our principal gain in fruit consumption has been in processed products, mainly canned and dried fruits.

It would be interesting to know something about the consumption of the minor fruits, such as apricots, cherries, and the various berries. Although their total is at present unknown, it undoubtedly would add a considerable amount to the above estimated consumption.

The development of canning is shown by statistics. In 1899 the per capita consumption of canned fruit was about 2.3 lb. In 1927 it was estimated at 10.6 lb. per capita. Peaches and pineapple easily lead the canned-fruit field, consumption of each being about 3 lb. per capita; canned apples about 1 lb. per capita; and the other fruits in much smaller quantities.

The dried fruits also have had a remarkable increase, from an estimate of about 1.2 lb. in 1899 to about 5 lb. in 1927. The principal increase, however, took place in the ten years following 1899, due largely to the development of the raisin and prune industries in California.

If we examine the figures for canned vegetables, we also find a similar increase from 10 lb. per capita in 1899 to 27 lb. per capita in 1927. More than half of the total for canned vegetables is made up of the three great staples, corn, peas, and tomatoes. Almost one-fourth is accounted for by canned beans, either as pork and beans or green beans of various varieties. All other canned vegetables are used in relatively small quantities. Dried fruit has always had an important place in the diet, but dried vegetables have never attained any great importance. Much time and money have been spent in trying to develop a satisfactory method of dehydrating vegetables, but the production still is practically negligible.

To summarize the situation: Although there is the popular belief that a vegetable diet has been increased, unfortunately we do not have statistical information to establish the facts one way or another. No doubt certain classes of vegetables, such as those produced during the winter months in Southern states and shipped to the Northern markets, have increased in use. Per capita consumption of canned vegetables has increased about threefold during the last 30 years.

Figures for the twelve principal fruits indicate that consumption of fresh fruits has remained at around 165 lb. per capita for the last 30 years. Meanwhile, a great increase in the consumption of fruits in the canned form has developed, as well as some increase in consumption of dried fruits. It should also be kept in mind that the great development in production and transportation of fresh vegetables, especially during the winter months, has also had a marked influence on the demand for fresh fruits, in particular apples, which for 50 years have been the standard winter fruit in the Northern states.

▼ ▼

Why Do Sodium Hypochlorite Preparations Differ in Corrosiveness?

By G. N. QUAM

Chemical Laboratories, Long Island University, Brooklyn, N. Y.

WHEN the word "water" is used one thinks of a liquid which may vary from pure hydrogen oxide (carefully distilled water) to a complex solution (such as drinking water or even river water). "Salt," to the layman, usually means a solid varying from pure sodium chloride to sodium chloride mixed with varying concentrations of many other salts, present as impurities. Other terms used in a very general way suggest themselves. It appears that the term "sodium hypochlorite" has been used with almost as much liberty. When one orders water for a storage battery, a product is demanded which fulfills rather restricted specifications, and is very different from that required by the steam engineer. Likewise, when one specifies "sodium hypochlorite" as the term is commonly used today in the trades, further explanation is necessary. To the chemist the term sodium hypochlorite means a very definite chemical compound, NaOCl, in the same way that water, to him, means H_2O. Sodium hypochlorite is not of the same order of stability

as water, however, and apparently no one has yet produced the compound of 100 per cent purity. Therefore, whenever the term "sodium hypochlorite" or "liquid sodium hypochlorite" is used, the degree of purity or the composition should be indicated in some definite way.

A NUMBER of ways of preparing sodium hypochlorite solutions are possible: Caustic soda or soda solutions may be chlorinated with free chlorine gas; bleaching powder may be permitted to react with soda solutions; or a solution of common salt may be electrolyzed. The solutions obtained may differ greatly in composition and in properties. The resulting available chlorine, which is of chief concern, usually is 1 to 5 per cent. Ten- to 15-per cent solutions may be prepared, but are found to be rather unwieldy. Under very favorable conditions the percentage of available chlorine may run as high as 40 and over, but such procedures are very impractical as yet and are, therefore, of laboratory importance only.

The composition may vary greatly due to methods of preparation. Varying concentrations of sodium hypochlorite and sodium chloride are always present, and many other salts may be present by virtue of the manufacturing process. The properties of the solutions differ accordingly. Not infrequently compounds such as soda, trisodium phosphate, borax, and water glass are deliberately added in more or less definite percentages to stabilize the product, to reduce its corrosive action, and to increase its cleansing action. Then, too, conditions arising in the course of preparation may introduce oxides of heavy metals into the solution. These oxides have very direct and specific effects on the stability of the hypochlorite solution. It now becomes apparent that when one says "sodium hypochlorite" or "liquid sodium hypochlorite" a rather complete modifying statement should follow. What kind of "liquid sodium hypochlorite" is concerned?

Recently I have become aware of the fact that altogether too many reports are presented in our journals in which the term sodium hypochlorite is used loosely in connection with specific data. The reports are good and the authors are conscientious men, but the data are very misleading and often contradictory, because several distinctly different kinds of solutions are mentioned under the general term "sodium hypochlorite."

IN a study of eight different chemical sterilizers (G. N. Quam, *Butter and Cheese Journal,* April, 1928), five of which were of the sodium hypochlorite type, the corrosive actions were found to vary greatly in solutions of the same available chlorine content. In that report I pointed out, with the aid of numerical data, that some commercial sodium hypochlorite sterilizers actively corroded metals commonly used in food-processing equipment while other products of the same type were practically non-corrosive in character. Nevertheless, it is in the field of corrosion studies that the misleading statements and data are the most flagrant. One investigator illustrates the very corrosive action on a strip of block tin "after one hour in liquid hypochlorite solution" with pictures showing the badly etched and discolored surface as compared with the apparently non-corroded strip exposed to a solution of a solid sodium hypochlorite preparation. The inference is that all "liquid hypochlorites" are highly corrosive. Another states " . . . the liquid sodium hypochlorites were most harmful as they readily dissolved it [tin]." This same author goes on to state: "liquid sodium hypochlorites were the only ones to affect the metal [Allegheny metal] visibly," and "liquid sodium hypochlorite readily attacks nickel." Again, I have before me an elaborate table giving losses in weight of various metal strips exposed to various chemical sterilizers under controlled conditions. One column is headed "sodium hypochlorite," with no further explanation in the article. What are we expected to conclude from the data?

Before drawing conclusions, note the data in the table, which have been established in my laboratory. The various commercial "sodium hypochlorite" sterilizers studied are numbered I to VI and the corrosive action on each strip of polished metal is indicated by loss in weight in milligrams per 3-sq.in. for 15 hours' exposure to solutions with 250 parts per million available chlorine at room temperature.

Comparative Corrosive Actions of Some Commercial Sterilizers of the Sodium Hypochloride Type

	Sterilizers					
	I	II	III	IV	V	VI
Metal	Mg. Loss	Mg. Loss	Mg. Loss	Mg. Loss	Mg. Loss	Mg. Loss
Copper	4.5	0.2	0.5	0.2	0.9	0.1
Tin	3.8	0.1	0.3	0.4	3.4	1.2
Nickel	3.0	0.1	0.2	0.4	2.5	0.4
Monel Metal	3.0	0.1	0.2	0.1	3.0	0.9
Steel (Allegheny)	0.1	0.0	...	0.0	0.0	0.05

That the "sodium hypochlorites" did not all act in the same way is apparent. All had the same available chlorine, but that is not the whole story. For block tin the variation of losses due to corrosion varied between 3.8 and 0.1; for nickel, 3 to 0.1.

As shown by the writer (FOOD INDUSTRIES, March, 1930) varying percentages of incorporated salts and bases have a marked effect on the corrosive action of a sodium hypochlorite solution, as well as on its stability. These and other variables, cited above, may indicate the difference between a highly corrosive and a non-corrosive product. Much disagreement of data could be cited on the subject of their bactericidal value and of their stability in the presence of various kinds of organic matter.

Many commercial products which may be classified in the sodium hypochlorite group are now on the market and the open claims in some instances are almost heroic. I have before me the outstanding claims for one in particular in which the expressions "the only non-corrosive hypochlorite" and "the only stable hypochlorite" stand out as a challenge. The product has been found to be quite low in corrosive action, but at least one other has been found to compare very favorably in both stability and rate of corrosion. The question of ethics in advertising "sodium hypochlorite" preparations is hardly within the scope of this discussion, especially because I claim no degree of intimacy with that art, but it is hoped that claims will be confined to facts. Some properties are common to all, and other properties to both solid and liquid in their original packages.

It is unfortunate indeed that the manufacturers and users of "sodium hypochlorite" preparations have been offered so much data that mean so little unless the kind of product is specified. In fairness to producers of "sodium hypochlorite" preparations made to meet specific needs, investigators in this field should be more cautious in the use of expressions that have acquired rather general meanings. On the other hand, the manufacturer should endeavor to inform the purchaser of the nature of the product purchased, by the employment of more complete labeling and the withdrawal of "broad and misleading claims."

Abstracts of Current Literature

MASSECUITE AND MOLASSES. R. C. Pitcairn. *Facts About Sugar,* Vol. 25, pp. 534-7; May 31, 1930.

Observation showed that time could be saved in operating a single-scroll helix crystallizer, if it was run half full with half the helix above the level of the massecuite. This led to the idea of superimposing one helix on another, to obtain a similar advantage with the crystallizer full. A crystallizer was built with superimposed helix and operated in comparison with the one having a single submerged helix. It was found that the time required for a given cooling and curing effect was reduced from 152 to 42 hours. The evaporation effect was observed also to be relatively greater. The speed of the helix has a considerable influence on the results; this is a factor which has not been sufficiently considered in crystallizer practice. It was observed also that formation of secondary, or false, grain was largely eliminated by the new crystallizer construction. This is believed to be due to the more uniform temperature distribution resulting from more even circulation. Curve charts are given, showing the time-temperature, time-gravity purity, and temperature-gravity purity relations for the old and new crystallizer constructions.

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VARNAU-WAYNE PROCESS. T. B. Wayne. *Facts About Sugar,* Vol. 25, pp. 520-2; May 24, 1930.

To meet the demand for extremely fine grained sugar in large quantity, the Varnau-Wayne process was developed and is now in commercial operation in Texas. The new process is a radical departure from customary practice for finely granulated sugar. It starts with a sirup of much lower density than the solids content of a pan-boiled massecuite. A practically grain-free sirup is obtained by evaporating in effects and finally in a finishing pan to a solids content of 80-85 per cent. Sudden chilling by passage in a mist or thin film into an air or vacuum chamber gives an instantaneous supersaturation effect, and eliminates the time factor in graining. The method produces a new type of extremely fine grained sugar, readily soluble and very pure. It permits a considerable heat economy and avoids the harmful effects of prolonged high temperature, high viscosity, and poor circulation which accompany the later stages of pan boiling. The process is continuous and nearly automatic, so that most of the personal factor is eliminated. Thus the product is more uniform than with vacuum-pan methods. The disadvantages are that special equipment is needed, granulator capacities are relatively lower, and slightly larger packages are needed, because of the lower volume weight of the product.

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COMMERCIALLY AND EXPERIMENTALLY MILLED FLOURS. Truman A. Pasco, Ross A. Gortner, and R. C. Sherwood. *Cereal Chemistry,* Vol. 7, pp. 195-221; May, 1930.

A comparison of the properties of flour from the same wheat milled in commercial mills and in a small experimental mill, shows that experimental milling does not give a reliable criterion of the saccharogenic activity of a flour. The flour from a commercial mill may have from one to four times the saccharogenic activity shown by the experimentally milled sample. Degree of granulation is important; a commercially milled sample was increased 35 per cent in saccharogenic activity by grinding 24 hours in a ball mill. The experimentally and commercially milled flours, though differing much in saccharogenic activity, did not differ appreciably in loaf volume; hence saccharogenic activity of a flour cannot be judged by loaf volume. Of the potassium halides, the bromide has the greatest peptonizing effect on flour proteins, the chloride next, and the fluoride least. The bromide, though giving the greatest peptonization, shows the least variability. Coefficients of correlation between loaf volume and fraction peptized, as determined for experimentally and commercially milled flours and for a series of mill-stream flours, indicate that objections which have been raised to the present definition of a "globulin" are fully justified. Numerous baking tests and measurements of saccharogenic activity are reported.

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SOLID CARBON DIOXIDE. F. W. Rabe. *Refrigerating Engineering,* Vol. 19, pp. 143-5; May, 1930.

The field of usefulness for solid carbon dioxide as a refrigerant can be defined in terms of its differences from water ice. Thus, from the thermal relations, the comparative refrigerating effect at 32 deg. F., is 1.85 times that of water ice, on a weight basis; and at 0 deg. F., three times that of water ice. On a volume basis the advantage is greater, owing to the higher specific gravity of carbon dioxide. The high insulating value of the gas evolved from carbon dioxide and the fact that carbon dioxide sublimes, are further advantages. There is danger, however, of overestimating these advantages; and such extreme claims have been made for carbon-dioxide refrigeration that the reaction against it has already been felt. Experimental measurements, therefore, have been made of the actual benefit which can be derived in practical operation from the insulating value of carbon-dioxide gas coming from the solid. This is one of the advantages which has been particularly subject to over statement. The trials indicate that the maximum increase in effective insulation by utilizing the gas is about 20 per cent; that is, at best the weight of solid carbon dioxide required will be at least 80 per cent of the amount based on a straight thermal comparison with water ice. With proper estimation of advantages, there is actually a considerable field for solid carbon dioxide. One of its major successful uses is in truck transportation of ice cream, or of any food which must be kept frozen.

* * *

ACIDITY IN ANGEL CAKE. Emily Grewe and Alice M. Child. *Cereal Chemistry,* Vol. 7, pp. 245-250; May, 1930.

The effect of potassium acid tartrate in angel cake is to decrease the size and wall thickness of the cells. In terms of brilliance, rather than hue, there is also an increase in whiteness. This is not an effect of the tartrate radical, because cakes baked with sodium potassium tartrate show the same inferiority in texture and color as those baked without potassium acid tartrate. On the other hand, acids such as citric, malic and tartaric have a similar effect to that of potassium acid tartrate. Hence it appears that increased acidity is responsible for the beneficial effect. Egg whites which differ in pH give similar color differences in the finished cakes; the higher the acidity of the egg white and the resulting cake, the lighter the color of the cake. The quinhydrone electrode was used for pH measurements; color determinations were made in terms of the Munsell system. Photographs are shown of a control and three specimens baked with increasing concentrations of acid potassium tartrate.

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BUTTER IN STORAGE. H. Macy. *Journal of Dairy Science,* Vol. 13, pp. 266-72; May, 1930.

A comparison has been made of the mold, yeast, and bacterial counts of salted and unsalted butter in storage, as related to keeping quality of stored butter. Samples were studied in six lots, the total number being 483 salted and 123 unsalted samples. Counts were made of mold, yeast, and bacterial cells before and after storage. In agreement with practical experience, it was observed that the counts increased during

storage in 70 to 85 per cent of the unsalted samples, and decreased in 60 to 75 per cent of the salted samples. Even when the salted butter contains less than 1 per cent of salt there is a sharp difference from unsalted samples. Indeed, the more highly salted samples showed no greater tendency toward decreased counts than did those with less salt. This is taken as an indication that the organisms which are checked by salt are sensitive to small concentrations. The storage conditions varied from ordinary conditions of production and shipment to market, to freezing storage (— 5 to — 10 deg. F.) for several months. The trials confirm the beneficial effect of salting on the keeping quality of butter, and show that a small salt concentration is nearly or quite as effective as a higher concentration.

* * *

VITAMIN A. J. C. Drummond, B. Ahmad, and R. A. Morton. *Journal of the Society of Chemical Industry.* Vol. 49, pp. 291-6T; July 4, 1930.

The identity of vitamin A with carotene has been thoroughly demonstrated, but it is true also that the animal organism converts the pigment carotene into a colorless substance for which it is convenient to retain the name vitamin A. It also has been found possible to make concentrated preparations having a hundred times the growth-promoting power of the pigment. Palm oils are interesting in that they have a carotene content sufficiently high to make them effective as sources of vitamin A for animals. One specimen of palm oil was found to be comparable in this respect to a good medicinal cod liver oil. As a vehicle for feeding carotene or vitamin A to animals, purified ethyl laurate (easily made from commercial lauric acid) is preferable to the natural edible oils, such as peanut oil, which have been used hitherto for this purpose. Feeding experiments with carotene have showed that there is very little storage of this substance in the liver. Extensive experiments in the purification of carotene and studies of its behavior toward oxidation have given evidence that the loss in potency with successive purifications is due to destructive oxidation rather than to the fact that the potent substance is not carotene itself but an active impurity progressively removed as the carotene is purified.

* * *

PROCESSED CHEESE. Hugh L. Templeton and H. H. Sommer. *Journal of Dairy Science,* Vol. 13, pp. 203-20; May, 1930.

In the production of processed cheese there must be adequate temperature control, both to insure proper pasteurization and to prevent the cheese from turning pink. If the cheese is to be held in the kettle for a considerable time, it should be at the lower pasteurizing temperature, and evaporation losses should be replaced by adding water. Close adherence to standards of moisture content is important both from the cost standpoint and for the sake of imparting uniform body to the product. The pH may vary between 5.8 and 6.2 without any adverse effect, and this factor can be controlled by proper care in blending. Age is an influential factor in successful processing; if the cheese is too young, there is excessive fat separation and the product is too rubbery; if too old, the body is weak and the texture grainy. The proper age is from four to seven months. Keeping quality of processed cheese is variable, depending on the acidity, the heat treatment, and to some extent on the storage temperature. Discoloration of the tinfoil may result from allowing the pH to rise above 6.3, or it may be caused by phosphate, if such is present in the emulsifier. Use of an emulsifier is beneficial, but the amount should be kept below 3 per cent, both for legal reasons and for the sake of quality of product. Trials indicate that sodium citrate is better than disodium phosphate as an emulsifier. Freezing does not prevent cheese from being successfully processed. One of the characteristic effects of processing is an increase in the content of water-soluble nitrogen. The amount of increase is quite variable, but averages about 26 per cent.

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THE MECHANIZATION OF PROCESS CONTROL. P. G. Pirrie. *Bakers' Weekly,* Vol. 66, p. 65, June 21, 1930; p. 49, June 28, 1930; Vol. 67, p. 59, July 5, 1930.

Process control starts with the proper quality of ingredients used. Proper flour storage and ingredient temperature are very important. Other important factors discussed are: mixing time, mechanical make-up, proofbox control, peel ovens, traveling ovens, oven steam control, and bread cooling conditions. A number of illustrations and photographs are given.

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BACTERIOLOGICAL CONTROL IN COMMERCIAL CANNING. E. J. Cameron and H. H. Loomis. *American Journal of Public Health,* Vol. 20, pp. 741-6; July, 1930.

Four well-defined bacterial groups are recognized in the spoilage of non-acid vegetables. These have a common characteristic of the ability to form spores highly resistant to heat. Field studies have shown that the development of thermophilic contamination takes place largely in the cannery itself. Such equipment as wooden brine tanks, blanchers, and cookers are likely to become contaminated with thermophilic bacteria, which may cause spoilage of the canned product. Refined sugar has proved to be an outstanding source of thermophilic spoilage bacteria, but this source is not a factor in the spoilage of acid products like fruits or tomatoes, since the acidity prevents the development of the spores. Spoilage by putrefactive anaerobes is relatively rare. No relation has been found between thermophilic spoilage or thermophilic contamination and sanitary conditions in the cannery. A bacteriological survey is necessary to keep bacteria in check.

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COMPARATIVE FUEL COSTS FOR BAKE-OVEN FIRING. W. G. Holmes. *Bakers' Weekly,* Vol. 67, p. 77; July 5, 1930.

The author finds a fuel cost of $0.64 per 1,000 lb. of bread, when fuel oil at $3.35 per bbl. is used; $0.89 for electricity as $0.01 per kw.-hour; $0.80 for hard coal at $14 per ton; and $1.05 for artificial gas at $1 per 1,000 cu.ft. In general, the large city favors gas operation and the smaller community the use of electric power; either, of course, always subject to the challenge of coal or oil.

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WILL HOUSEHOLD FORMULAS OPEN THE WAY TO THAT 1½ BILLION DOLLAR CAKE MARKET? C. A. Glabau. *Bakers' Weekly,* Vol. 66, p. 60, June 21, 1930; p. 44, June 28, 1930.

The bakers' present market is estimated at 25 per cent and the permanent home production at 20 per cent of the total cake production. The remaining 55 per cent of the cake market is available to the baker. A home-like angel-food cake was produced from a household formula and found to receive the highest score rating, while cake produced by the bakers' method received the lowest scoring. Chocolate-fudge cakes and yellow loaf cakes also were tested. Formulas and methods are described in detail. Bakers should test each cake before it is presented to the consumer.

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CLEANING PANS. S. Hawthorne and Edward Creety. Bulletin 55, American Society of Bakery Engineers. (May be secured from Victor E. Marx, Secretary, 1541 Birchwood Avenue, Chicago, Ill.)

This bulletin treats from a practical standpoint the various methods of handling the problem of pan cleaning. It summarizes the experience of the authors with various methods in connection with ordinary plant operations at the Gordon Baking Company, Los Angeles, Calif., and Peoples Baking Company, Oakland, Calif.

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PIE CRUST. C. A. Glabau. *Bakers' Weekly,* Vol. 66, p. 68; May 10, 1930.

Three methods of making pie crust are described, with photographs of the products made. Important factors discussed are: methods of creaming various proportions of flour and shortening, and adding to this creamed mass the remainder of the ingredients: the oven temperature; the quantity of water used, and the temperature of the various major ingredients.

Critical Book Reviews

CO-OPERATIVE MARKETING OF FLUID MILK. by Hutzel Metzger. Technical Bulletin No. 179; May, 1930; U. S. Department of Agriculture, Washington, D. C. 92 pp. Price 20 cents.

THE SALE and distribution of fluid milk by means of collective action on the part of the producers is described from its inception in 1883 to the present time, the findings being based upon a comprehensive survey of the 159 fluid milk co-operative associations reporting to the U. S. Department of Agriculture in 1929.

Speaking generally, these organizations are of either the bargaining or operating-marketing type. The former functions merely as a broker, with no physical handling of milk; the latter operates handling facilities, often functioning also as a bargaining association. Where more milk is consumed than is produced in the immediate vicinity, the tendency is toward bargaining associations, typified by Philadelphia, Boston, Washington; where the metropolitan milk shed produces a surplus, operating associations are to be found, as in New York, Cleveland, Cincinnati, St. Paul, Minneapolis, and Los Angeles.

Matters treated in general fashion include: organization, pooling practices, financing, seasonal variation and production, control, and price policies and plans. Detailed methods of operation are given of eight representative associations, five bargaining associations.

As these 159 associations market 40 per cent of the milk sold in this country, this discussion of their methods of operation should be of interest to all who are concerned even indirectly with the milk-products industry. The report is supplemented by much statistical data of an economic nature.

R. G. GOULD.

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FOOD PRESERVATION. By W. W. Chenoweth, Professor of Horticultural Manufactures, Massachusetts Agricultural College, Amherst, Mass. John Wiley & Sons, New York City. 344 pp. Price, $3.

QUITE frequently the editors of FOOD INDUSTRIES receive letters from people desirous of entering the field of food manufacture asking for information in printed form that will enable them to get started. The book by Professor Chenoweth is particularly adapted to answering all of these inquiries for it is written from the standpoint of the home or farmer manufacturer. It is quite gratifying to the reviewer to find that this book is technologically sound, for often the writer who is addressing a non-technical audience has failed to verify many of his statements.

The following sentence, quoted from the preface of the book, states its aim very clearly: "If this book can help to sustain and increase the interest in food preservation on the farm and in the home, and if it can simplify present-day methods and add to their safety, it will have satisfied the hopes and wishes of the author."

After several chapters discussing the equipment that is used in food preservation, the various types of products are taken up, such as the canning of fruits, vegetables, meats, poultry and fruit products; the manufacture of fruit butters, conserves, marmalades, jams, jellies, preserves, candied fruits, and fruit candies; pickled and spiced fruits; pickles and relishes; beverages; sirups and maple products; cider and cider products; meat and meat products; marine products. There is also a chapter on drying and evaporation and another on the layout of the home factory.

A brief but excellent history of the art of canning is given in the second chapter. In the appendices are tables useful to persons engaged in food manufacture. One appendix also contains the federal food law, with certain of the regulations pertaining to its enforcement. In a chapter on foods is given a chart showing the food value of an average serving of food materials of the commoner type. This chart is a compilation from leading authorities in nutrition and gives the energy factors as well as vitamin distribution.

L. V. BURTON.

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THE WORLD WHEAT CROP SITUATION 1928-29. By M. K. Bennett. Wheat Studies of the Food Research Institute, Vol. VI, No. 2. December, 1929. Stanford University, Calif. 110 pp. Price, $1.

A REVIEW of the crop year embodying a discussion concerning the world supply, stocks and carryovers. price movements, international trade in wheat and flour, and a statistical appendix containing much interesting data for the period 1920-29.

For several months we have been aware that growers of the 1929-30 crop will have a difficult time to find a market in spite of government assistance. This study shows in an authoritative and convincing manner why this situation exists. The crop year 1928-29 was an unusual one in wheat. The world crop (omitting Russia, China, and Asia Minor) stood 16 per cent above the 1922-27 average. For the first time in many years a bumper world wheat crop followed a distinctly good crop; and wheat supplies were exceptionally abundant. Although consumption unquestionably was heavy, it was not in proportion to the production.

Much apprehension is being felt at present regarding the 1929-30 crop, which shows promise of being a good one. Government assistance to the wheat growers of the United States has resulted in large stocks in storage at a price considerably higher than the present market and very probably higher than the market will be in the future unless some action be taken to effect less seeding.

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Government Publications

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.*

The Coffee Industry in Brazil, by Walter Gay McCreery and Mary L. Bynum. Bureau of Foreign and Domestic Commerce, Trade Promotion Series 92; 20 cents.

Salvador as a Market for Foodstuffs, by H. P. Macgowan. Bureau of Foreign and Domestic Commerce, Trade Information Bulletin No. 692; 10 cents.

Cornstalk Plastic, by C. E. Hartford. Bureau of Standards Miscellaneous Publication 108; 5 cents. Describes manufacture and properties of a cellulose product (Maizolith) from cornstalks and corncobs.

Maple Sugar and Maple Sirup. Tariff Commission report to the President; 10 cents. Discusses differences in costs of production of maple sugar and maple sirup in the United States and in the principal competing country (Canada).

Census Data by Industries. Pamphlet from the 1927 Census of Manufactures; 10 cents. A résumé by industry groups and by industries.

Tariff Reports. Issued by U. S. Tariff Commission; 10 cents. Indexes numerous statistical and economic surveys.

Utilization of Shrimp Waste, by F. C. Vilbrandt and R. F. Abernethy. Bureau of Fisheries Document No. 1078; 10 cents.

◂◂ What's on Your Mind?

Quick-Freezing Terminology

The question as to just what is meant by the term "quick-freezing" was raised in an editorial in the June issue of Food Industries *after several cases involving what seemed to be a misappropriation of the term had come to the attention of the editors. The difficulties of setting up an accurate definition for so relative a word as "quick" appear great. A number of apparent inconsistencies in the findings of various workers can undoubtedly be ascribed to confusion from this source. The letters below from two of the most prominent figures in this field should help considerably in determining the limits within which the term can logically be applied.*

To the Editor of Food Industries:

I have read with considerable interest the editorial in your June issue, entitled "How Fast Is Quick?" Perhaps the following thoughts based on considerable experience with a wide variety of products may be helpful in this connection:

In the first place, "quick-freezing" has an entirely different significance when applied to animal and vegetable products. The cell walls of the former —and in this classification I include all of the higher members of the animal kingdom—are elastic, and so are not broken by the mere expansion of either intra- or inter-cellular moisture during the freezing process. If they are broken, it is through the formation of ice crystals sufficiently large to rupture a considerable proportion of the cells and to compress others into tough dehydrated bundles. A quick-frozen animal product, therefore may be defined as *one which has been frozen too quickly to allow the formation of sufficiently large ice crystals to rupture the tissues.*

In other words, quick-freezing must accomplish a certain definite result, but the speed of freezing required to produce that result may vary with different types of flesh. Whether a particular piece of flesh has been "quick-frozen" may be determined in any competent laboratory.

On the other hand, the cell walls of vegetable matter are composed of inelastic cellulose and are therefore practically sure to be broken by the mere expansion of moisture, whether the freezing be fast or slow. Thus a strawberry which has been frozen with extreme rapidity in liquid air has its cell structure just about as thoroughly destroyed as would have been the case if the berry had been slow-frozen in an ordinary "sharp freezer." Therefore, quick-freezing does not prevent cell damage in vegetables and fruits. It does, however, have certain other substantial advantages of sufficiently great importance to justify the use of quick-freezing apparatus. When fruits or vegetables are frozen too slowly in ordinary sharp freezers, especially if the freezing is done in bulk packages such as barrels or large cans, a considerable proportion of the product is likely to become oxidized, harmful organic growth takes place in the center of the package before the heat has been extracted therefrom, differences in moisture content and specific gravity are pretty sure to develop in various parts of the package, and very large crystals—some times as large as a fountain pen—form throughout the mass of the frozen product.

To summarize, may I repeat that a "quick-frozen" meat product is one in which the ice crystals are so minute that they do not damage the cell structure, while a quick-frozen vegetable or fruit product is one which has been frozen sufficiently rapidly to prevent substantial damage from any or all of the following causes: oxidation, growth of deleterious organisms, lack of uniformity throughout the package, and the formation of large crystals in the bulk of the product.

If the foregoing basic considerations are kept clearly in mind much confusion will be avoided.

Clarence Birdseye.
Gloucester, Mass.

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To the Editor of Food Industries:

A definition of "How Fast Is 'Quick'?" involves such a multiplicity of factors that it is with some hesitation I attempt to clarify some of the points raised in your recent editorial.

The word "quick" obviously is a relative term and is, therefore, subject to widely divergent interpretations. Originally products were just "frozen." About fifty years ago an improvement in speed of freezing was made for which the term "sharp-freezing" was subsequently coined. The improvement was based mainly on an increase in coil surface in air freezing rooms. Quite recently further improvements in "sharp-freezing" have been made (particularly in various packing houses). Heat-absorbing surfaces have been further increased, insulation has been improved, and fans and air-duct circulations have been introduced. It should be kept in mind, however, that freezing under these additional improvements is still "sharp-freezing." True "quick freezing" (as obtained when the Petersen principle is utilized) is still about two to five times as rapid for the same cuts as this improved "sharp-freezer" freezing, with correspondingly better quality and less loss by evaporation.

Some twenty years ago freezing by direct immersion in brine was put in practical use abroad to a limited extent, particularly for fish. The term "brine freezing" has since been commonly used for this general type of freezing, including, of course, direct spray and trickle systems.

Many years of experimentation without practical success and with drawbacks definitely established had, by 1921, given the term "brine freezing" an unhappy connotation. When I made my invention, therefore, I did not wish to classify this system as "brine freezing," although brine was utilized, for in my system the brine came in intimate —*but indirect*—contact with comestibles. The advantages of my system were mainly: (1) a much increased speed in freezing, which was responsible for great improvements over "sharp freezing," and (2) elimination of the drawbacks attending "brine freezing." "Brine freezing" having previously been recognized as of great advantage, due to its speed if only its drawbacks could be eliminated, it seemed logical to concentrate advertising and propaganda on the speed of the new system. The terms "rapid-freezing" and "quick-freezing" were consequently emphasized (almost interchangeably) in describing my invention.

That was nine years ago. The developments of importance in the entire subject of freezing since 1921 fall broadly within three classes: (1) Systems built on the Petersen principle; (2) improvements in "sharp-freezing," and (3) systems using (1) and (2) in various forms of combinations.

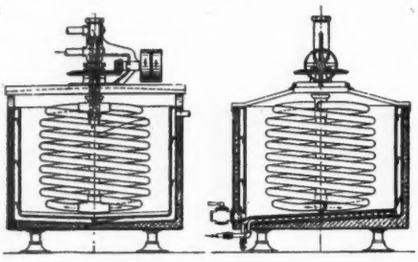
True "quick-freezing" is both directly and indirectly responsible for many advantages. It is responsible for creating ice crystals of such small size that they do not damage the cell web of flesh articles. It is responsible for diminishing inherent osmotic action during freezing. It is also responsible for diminishing evaporation loss during freezing and for arresting or slowing up such factors as oxidation, desiccation, and the growth of deleterious micro-organisms.

It is hardly possible to distinguish in a few words between true "quick-freezing" and freezing which is simply quicker than products in question were frozen before. For my own and the later developments of true "quick-freezing," such as the Birdseye belt system and the Kolbe diving-bell system, it is unfortunate that attempts to appropriate the term "quick-freezing" have been and are being made by less satisfactory systems. However, the specific connotation given the term "quick-freezing" through my invention is too recent to be in the dictionary and therefore does not prevent misappropriation by others. *Trademark protection, the superior quality and other merits of the article rather than the method by which it has been produced* will therefore, in my opinion, constitute the soundest basis for future consumer propaganda and advertising.

Paul Willer Petersen.
Chicago, Ill.

Selected Patents

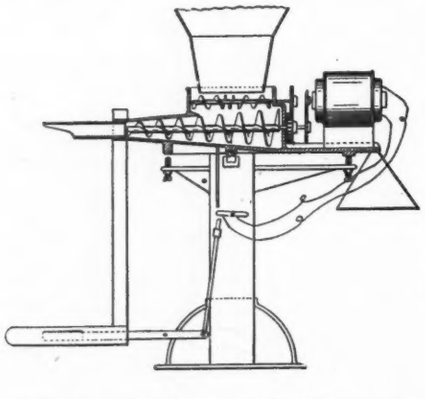
Rectangular Milk Pasteurizer With Helical Agitator and Jacketed Walls—Fritz G. Cornell, Jr., Caldwell, N. J., to Jensen Creamery Machinery Company, Inc., Bloomfield, N. J. No. 1,759,440. May 20, 1930 — The walls of this rectangular-shaped container consist of a glass-coated steel inner wall and a cork-lined outer wall. Between the inner and the outer walls provision is made for the flow of a temperature-regulating medium. Thorough agitation and



uniform temperature control of the liquid in all parts of the container are obtained by a centrally located gear-driven unit consisting of two helical tubes. These tubes are united at the bottom by a T-shaped head and at the top by a hollow central tube which incloses an inner tube arranged to serve as a means of conveying to and carrying away from the helical tubes the temperature-regulating medium.

* * *

Combination Bag Filler and Weigher—Esli A. Marsh, Chicago, Ill., to St. Regis Paper Company, New York, N. Y. No. 1,766,444. June 24, 1930—A downward feeding hopper with a motor-driven self-clearing agitator supplies material to a horizontally discharging receptacle. The contents of this re-



ceptacle are forcibly expelled through a tubular side opening over which is slipped the open corner of the bag to be filled. The weight of the bag and support is counterbalanced on opposite side. To this weight is added the weight of the material to be filled into the suspended bag. The motor driving the hopper agitator and the filler propeller is fitted to the other side of the filler receptacle. The filler receptacle with the attached motor, the bag holder and filling tube, and the counterpoised weight are suspended on pivots directly under the middle of the hopper. When the desired weight of material has been forced into the bag to cause the counterpoised weight to be lifted from its supporting headscrew, the downward movement of the bag and its supports causes the breaking of an electrical contact which immediately stops the motor and thus prevents further filling of the bag. Foot-lever control permits removal of the filled bag and fitting on of an empty bag before the mechanism is allowed to return to the filling position. This closes the electric circuit and starts the motor.

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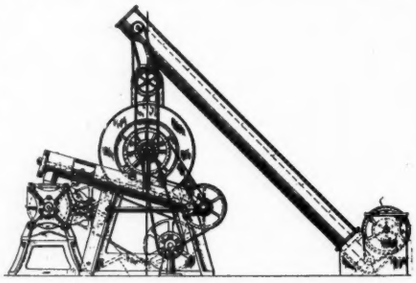
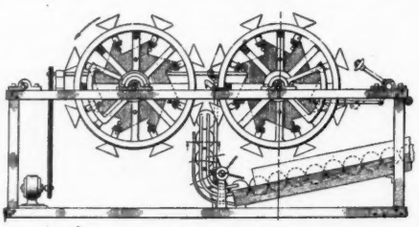
Continuous Dehydration Process for Fat-Bearing Materials—Stanley Hiller, Oakland, Calif. No. 1,760,059. May 27, 1930—Moisture content of animal and vegetable fat-bearing material is claimed to be reduced to approximately 12 per cent before it reaches the continuous press. During the process the material is kept at a temperature between 110 deg. and 120 deg. F. By moving the



material in a continuous manner against a current of heated air through a preheating and a final drying chamber, which are fitted with conveying and scraper agitators, the reduction in moisture content is accomplished. The unit as described is complete and continuous in operation from the grinding of the fat-bearing material to the press that separates the fat from the non-fat solids.

* * *

Gravity Feed Citrus Fruit-Juice Extractor—George W. Edwards to Sunset Gold Packing Company, Oakland, Calif. No. 1,764,158. June 17, 1930—The illustration shows how the fruit is fed by gravity into a position where it can be picked up by cup-shaped holders, which



are attached to wheels rotating in opposite directions. These holders keep the fruit in a steady position as the wheels rotate, carrying the fruit upward in the path of a knife that splits the fruit in halves. Each half remains in its respective cup. The opposite end of each cup unit is fitted with a gear part and is designed to impart a rotating action to the entire unit when brought into contact with a cam-operated squeezer head. As this cam action brings the squeezer head into contact with the rotating cup, which is fitted with lugs to hold the fruit in position, a vacuum is applied to suck the juice through the squeezer head and into a container. When the wheels carrying the cup units have rotated further the cam action reverses itself, the squeezer head is returned to its former position, a short impulse of compressed air clears the perforations in the squeezer head, and the rind is discharged from the cup-shaped holder.

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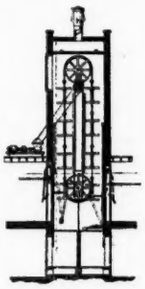
Continuous Smoke House—Robert E. Jordan, Chicago, Ill., to Allbright-Nell Company, Chicago, Ill. No. 1,755,878. April 22, 1930—Material to be smoked is continuously loaded into and discharged from the smoke house. The accompanying illustration indicates the manner in which the loaded trays mechanically enter and are removed from the smoke chamber, and how they are suspended from parallel sprocket-driven chains which move continuously at a regulated speed. This permits simultaneous attaching and detaching of the loaded trays and makes possible subjecting meat to chamber conditions for a uniform, definite length of time.



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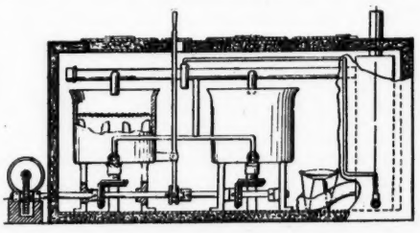
Melting Kettles at Constant Temperature—Russell Stover, Denver, Colo. No. 1,759,964. May 27, 1930—By this invention supply kettles such as are used for melting chocolate and the like are inclosed in an insulated cabinet and are equipped with a grid compartment fitted above the agitating mechanism of the kettle. In the insulated cabinet, heated



air is circulated under controlled temperature conditions that maintain the melted material in the kettle and delivery pipes at the desired temperature and furnish a continual supply of melted material into the lower portion of the kettle. The grid compartment is kept filled with the material to be melted without interfering with the temperature of that already in the molten state.

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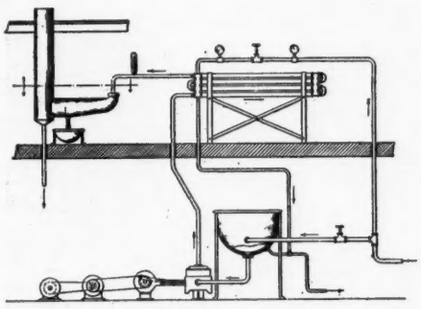
Coil-Type Candy Cooker—William P. Reed, Chicago, Ill. No. 1,756,662. April 29, 1930—In this process the constituents are mixed in a steam-jacketed kettle and pumped under pressure through a series of steam-heated coils. Pressure and temperature in the coils are regulated by



speed control of the pump and by valve regulation of the steam inlet to the heated coils. The cooked material filled with superheated moisture discharges into an enlarged baffled receiver that permits removal from the system of the excess moisture as steam and the collection of the cooked material into the desired receptable. A slow-speed pump of the piston type with double-acting valves is recommended.

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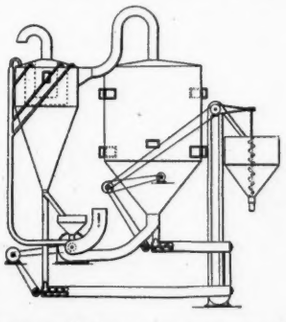
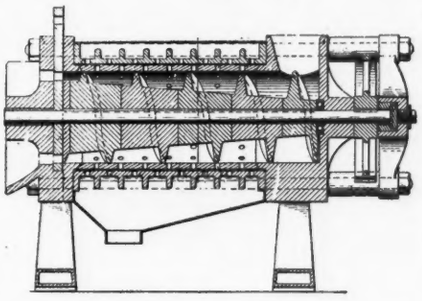
Irradiating and Pneumatic Blending of Dry Materials—Francis C. Beardslee to B. M. Huffine, J. I. Huffine, and Francis C. Beardslee, Los Angeles, Calif. No. 1,759,680. May 20, 1930—Material to be irradiated and blended enters the system through a hopper connected with an air intake duct, which is in communication with a blast fan. The force of the air from this fan carries the material to the irradiating chamber, which is equipped with suitable lamps to produce ultra-violet rays, and holds the material in suspension in this chamber sufficiently to give full exposure to irradiating rays. By suction and by force of the air blast from the fan the treated material is carried from the top of the irradiating chamber through a gooseneck duct into a separator. The upper part of this separator consists of a series of concentric cylinders closed at the top, except the central one, which is fitted with a hook-shaped air vent. These cylinders are open at the bottom, except the outer one, which terminates in a conical collector, and are of varying length, the inner one being shortest.



The outer cylinders are connected from the top with suction ducts that lead to the air intake at the fan. The entry is made at a point between the fan and where the feed hopper enters the intake duct. It is claimed that this construction of the separator prevents loss of material to the atmosphere through the top vent and reduces return to the system through the suction ducts. A screw conveyor and bucket chain elevator convey the treated material from the separator to a receiving hopper for final disposition. Provision is made in the irradiating chamber and in the separator for bypass removal of material, if necessary.

Continuous Filter Press for Pastes Having Low Liquid Content — Adolph F. Wendler, Buffalo, N. Y., to National Aniline & Chemical Company, Inc., New York, N. Y. No. 1,765,389. June 24, 1930—Liquid from thick pastes is expressed and filtered in continuous operation by the utilization of an expeller type of screw press. Material is fed by hopper into one end of the pressing chamber and the dry cake is delivered through a perforated end plate. This plate serves the double purpose of holding back the material to give sufficient pressure to force out the liquid and of permitting discharge of the dry material from the pressing chamber.



The pressing chamber consists of concentric perforated shells with an interposed filtering medium. The filtering medium is supported to withstand the high pressures by a staggering of the openings in the inner and contiguous outer shell. This construction causes the filtrate to flow in an edgewise direction through the filtering medium from the perforation in the inner shell to the nearest one in the outer shell. This outer shell is in two sections, which permits the changing of the filtering medium and the cleaning of the perforations in the inner shell if they become clogged.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

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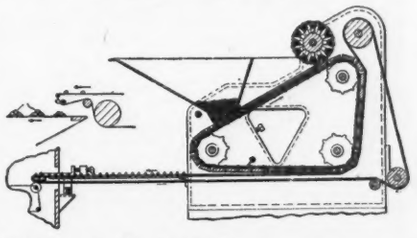
Confection Clusters Made Mechanically—Alonzo Linton Bausman, Springfield, Mass. No. 1,761,065. June 3, 1930—By mechanical means, peanuts or the like are fed individually in rows across an enrober feeder belt. These peanuts pass in a uniform manner through the enrober to receive their coating of chocolate, or the like, in quantity which is said to be less than the weight of the peanut by the time the coated nut is ready to be dropped on the conveyor belt of the chilling tunnel. The movement of this conveyor belt is so correlated with that of the enrober delivery belt that it progresses a unit of distance only after the desired number of coated nuts are dropped on top of each other to make a cluster of predetermined size. It is claimed that a cluster having uniform size and shape is made in this manner and that the cluster consists of more than 50 per cent nuts, by weight.



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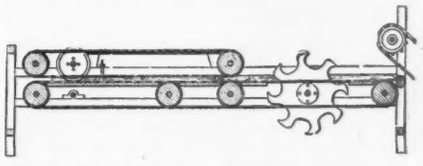
Propeller Type of Mixer—Henry S. Beers, Westport, Conn., to Turbo-Mixer Corporation, New York, N. Y. No. 1,762,950. June 10, 1930 — In an endeavor to eliminate zones of a sluggish agitation or circulation, the tubular flow director is given special flared form. Agitators of the propeller type are located in the intake portions and adjacent to the discharge ports of the director to give greater agitating effect. In mixers designed to give greater blending or disintegration to the material mixed, grater teeth or similar agents may be included in the construction of the flow-directing mechanism.

* * *

Filleting of Small Fish — Arthur R. Rogers, Jonesport, Me. No. 1,750,431. March 11, 1930—This machine is designed primarily for cutting fish of small sizes. It does not require the use of water to position the fish prior to being cut.



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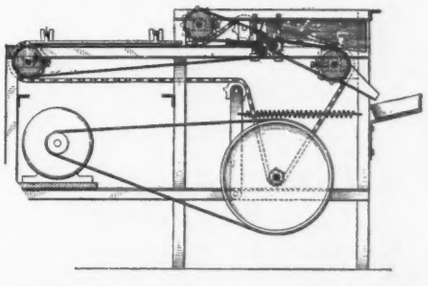
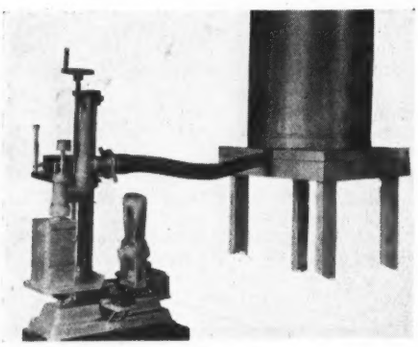
Mechanical Divider for Candy Bars—Herbert J. Melville and Harold E. Atchison to Curtiss Candy Company, Chicago, Ill. No. 1,765,990. June 24, 1930—By this invention narrow slabs of candy which have been scored are mechanically divided into individual bars. Superimposed belts, which are driven by pulleys that can be adjusted to regulate the distance between the belt surfaces, convey the scored candy slab between them to meet a third belt driven by a pulley so situated as to cause an abrupt upward change in the direction of the candy slab. This nearly 90-deg. change in direction causes the segments to break loose from the main body of the slab along the scoring and to proceed along the third belt as individual candy bars.



Manufacturers' News And Equipment

Regulated Weighing Of Liquids

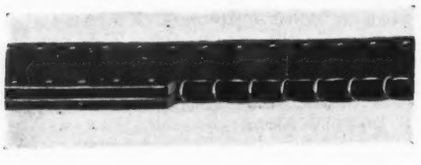
LIQUID containers varying in capacity from ½ to 5 gal. are filled, weighed, and checkweighed in one operation by the Exact Weight liquid filling machine manufactured by the Exact Weight Scale Company, Columbus, Ohio. It is said to operate at the rate of twelve 1-gal. cans per minute of average viscous liquid, provided the can opening is not too small.



This machine automatically controls the head pressure of the liquid, thus assuring the delivery of a consistent volume of material to the container; is electrically operated with a cutoff which is regulated by use in connection with a sensitive self-indicating type of scale; and is equipped with threadless, leakproof connections which makes it easily moved and connected to a number of tanks. It is said to be so designed that it can be readily taken apart and all parts easily and thoroughly cleaned.

Elimination of Static On Belt Drives

A SPECIALLY constructed leather belting has been developed by the Chas. A. Schieren Company, 30 Ferry St., New York, to make belt drives static-proof. This belting has a row of copper-wire stitching along each side to make contact with the pulley. By means of the wire stitching the static charges, which normally collect on the outer surface of the belt, are led off through the belt.



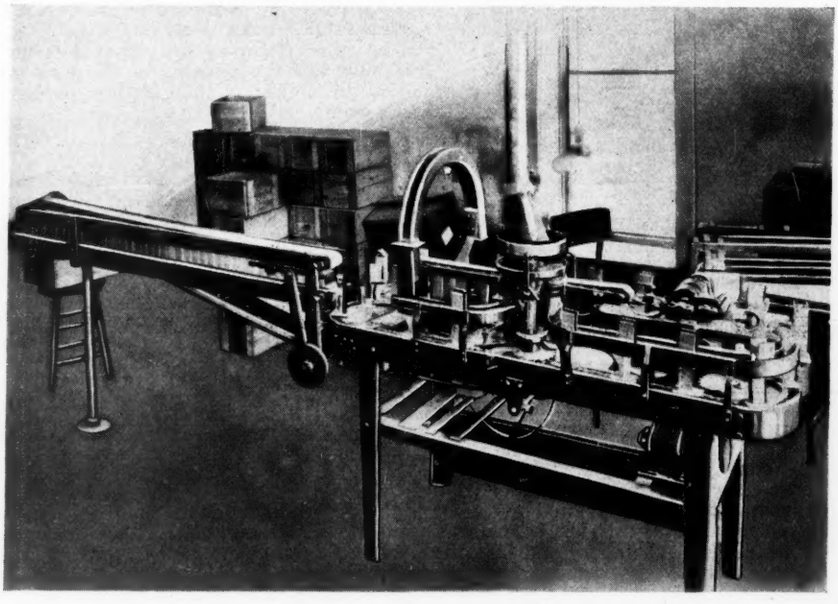
To keep these belt drives constantly free from static it is essential that the pulleys be constructed of static conducting material, that they be always well grounded, and that the points of contact with belt drive be kept free from insulating material.

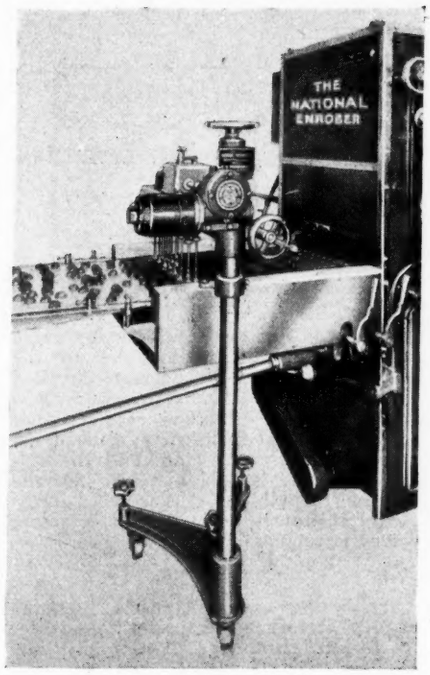
Automatic Filling and Sealing Machine

A COMBINATION volumetric filling and top-and-bottom carton sealing machine has been recently developed and marketed by J. L. Ferguson Company, Joliet, Ill. It is used extensively for packaging food products that are free flowing. By using change parts, which are furnished, packages of more than one size can be handled.

The cartons automatically trip the filling mechanism; hence in the absence of a carton the filling machine does not operate. Simplicity in construction makes the machine easy to operate and to clean. It requires small floor space and handles 45 packages per minute. A ½-hp. motor operates it.

Pack-O-Matic Filler and Sealer



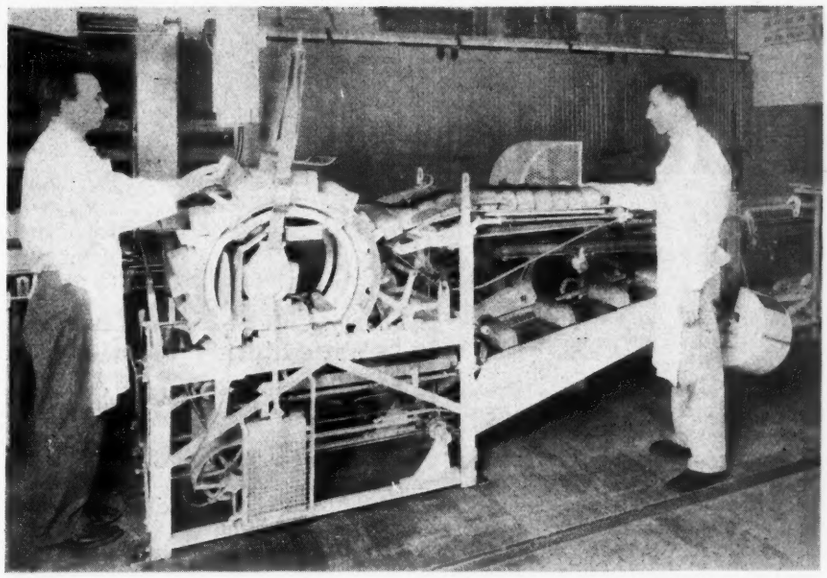


Bausman Spindle Decorator

Spindle Decorator for Coated Confections

DESIGNED to decorate any piece of confection coated on an enrober, the Bausman spindle decorator has been developed by the National Equipment Company, Springfield, Mass. It is made to fit 16, 24, and 32-in. enrobers and to operate from any electric-light socket.

Assorted sizes and shapes of goods are said to be satisfactorily decorated on the same enrober at the same time by this equipment. It is supposed to do the work of as many as six operatives on a 24-in. enrober and to eliminate hand work between the feeding of the enrober and the packing of the finished goods from the delivery belt.



Hartman Automatic Bread Slicer

New Bread Slicer Feeds to Wrapper Continuously

A CONTINUOUS slicing and wrapping operation requiring only two operators is made possible by the Hartman automatic bread-slicing machine that has been developed by Booth Engineering, Inc., 15 Park Row, New York City, and Los Angeles, Calif. The machine will handle 2,400 loaves per hour. One operator feeds the bread into the machine top side up. As the sliced loaf comes out of the machine bottom side up, the other operator slips on it a waxed paper tray, which carries the loaf intact to the wrapping machine.

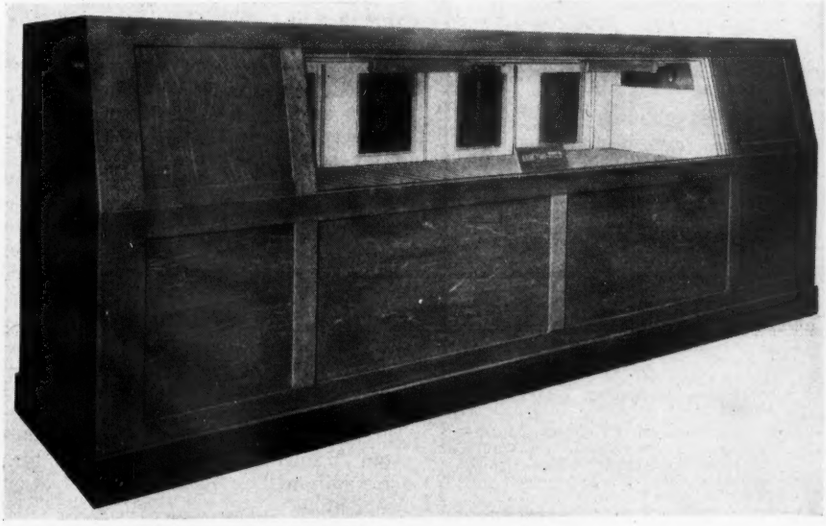
The machine is self-contained and has the drive motor set in the base. The crankshaft runs on ball bearings in a closed crankcase. The high-speed, short-stroke, reciprocating knife motion is arranged so that no two knives start cutting at the same time. They follow one another, and during one revolution of the crankshaft all make one stroke. No tools are required to replace knives.

A Hartman Junior slicing machine, with a production of 1,000 loaves per hour, has been developed to meet the requirements of small and medium-size bakeries.

Both sizes of Hartman bread-slicing machines are capable of slicing any type loaf—white, raisin, whole wheat, pan, or rye. Both machines are regularly built to cut any length loaf up to 13 in. and with slices of $\frac{3}{8}$ in. or $\frac{1}{2}$ in.; they can also be furnished to cut loaves up to 24 in. in length if desired. The cost of bread slicing has been reduced, it is claimed, to an average of not more than 0.4c. per loaf—including the cost of the tray or carton, labor, and fixed charges.

Display Case for Frozen Food

A FROSTED meat-display and storage case, which has been so designed that defrosting of the coils may be accomplished without loss of the low temperature necessary for refrigerated storage of merchandise during the defrosting period, is announced by the Electro-Kold Corporation, Spokane, Wash.



Electro-Kold Display Case

Two E.C.—47—fin coils are used, one in each end, and the bunkers are constructed so that stoppers may be put in the air flues by a simple plug arrangement; the packless type shut-off valve closed; a special door removed; and either coil defrosted without in any way interrupting the operation of the other. This is said to permit complete defrosting of coils in less than one hour.

A special thermostatically controlled circulation fan is installed to maintain a uniform temperature of 20 deg. F. or lower throughout the display compartment, and a correspondingly lower temperature in the storage compartment. The compressor equipment is an Electro-Kold standard type AA twin-cylinder 1-hp. air-cooled unit. The case has 5 in. of insulation in the bottom and ends, and 4 in. in the top, front, and back walls, and doors. Triple-pane glass is used for front display and special lighting fixtures are installed to illuminate the interior.

▸▸ Manufacturers' Publications

Chewing Candy—A 40-page booklet published by the Nulomoline Company, 111 Wall St., New York, is devoted to detailed formulas for chewing candy.

Molasses Candy Formulas—In a 44-page booklet the American Molasses Company, 109 Wall St., New York, has compiled numerous formulas for the manufacture of molasses candy. Detailed instructions are included.

Roller Bearings—A 36-page booklet devoted to roller bearings has been made available by the Roller Bearing Company of America, Trenton, N. J. It is known as Catalog No. 40, and gives informative data and specification applicable to Heliflex bearings.

Self-Contained Refrigerating Units—In a 16-page illustrated booklet the York Ice Machinery Corporation, York, Pa., calls attention to the parts and detail construction of its refrigerating units. The booklet is known as Bulletin 3086.

Ice Cream and Dairy Equipment—In Bulletin No. 30128, containing 24 well-illustrated pages, the York Ice Machinery Corporation, York, Pa., calls attention to its ammonia liquid circulating system and other equipment.

Unit Heaters—By means of an illustrated leaflet the Buffalo Forge Company, Buffalo, N. Y., announces its new 16-in. Twin Breezo-Fin unit heater. A detailed rating table of this heater is included.

Centrifugal Pumps—In an 8-page, well illustrated booklet the American Steam Pump Company, Battle Creek, Mich., gives detailed information regarding its Type Q centrifugal pump.

Weighing Liquids Automatically—Bulletin No. 2130 is a 20-page booklet illustrated with pictures and line drawings issued by the Richardson Scale Company, Clifton, N. J.

Pumps and Compressors—In Catalog No. 102, a 14-page, illustrated booklet, Cross Reynolds Company, Inc., 17 John St., New York, N. Y., describes thermo-compressors and 2- and 3-stage evacuators.

Conveyors—Helicoid conveyors are described by Bailey-Burruss Manufacturing Company, Atlanta, Ga., in illustrated leaflets.

Centrifugal Pumps—A 48-page, illustrated handbook of data on theory, characteristics, operation, and installation of centrifugal pumps, is published by Goulds Pumps, Inc., Seneca Falls, N. Y., as bulletin No. 401.

News of the Month

Packers' Decree Hearing Set for Oct. 7

THE petitions of Swift & Company and Armour & Company for modification of the packers' consent decree will be heard on their merits at a hearing to open Oct. 7, according to an order of the Supreme Court of the District of Columbia signed by Justice Bailey on July 11.

The litigation concerning the decree, which began almost immediately after it was signed ten years ago, reached its present state after Justice Bailey refused motions by the American Wholesale Grocers' Association and the National Wholesale Grocers' Association to dismiss the petition of the packers for modification.

On June 28, in ruling on the motion, Justice Bailey declared in his opinion that "it is not necessary at the present time to decide upon the power of the court to modify the consent decree without the consent of the parties to it. If, after a full hearing, the government should become convinced that the decree should in justice to the defendants be modified and should consent to the modification, the refusal of the intervenors [the grocers' associations] to consent would not in itself prevent the court from modifying the consent decree, if the court should take the same view as the government upon the facts presented to it."

The Department of Justice has declined to stipulate modification of the decree and will present to the court in coming hearings "every justifiable argument and fact which tends to the conclusion that the decree should not be modified," it was stated in a report submitted to the Senate July 21 by Attorney General William D. Mitchell.

Peach-Freezing Plant Now in Operation

COMMERCIAL production of frozen Georgia peaches was begun on July 10 with the opening of the plant of Tom Huston Frozen Foods, Inc., at Montezuma, Ga. The plant has been equipped to handle 100 bu. of peaches per hour during the peak of the season.

The peaches are graded, peeled, pitted, and sliced in a manner similar to canning operations, and are then packed with sugar in 1-lb. waxed cardboard containers. These containers are loaded on racks and run into a tunnel freezer, similar to the ordinary tunnel dryer, where air at—35 deg. F. freezes them in several hours' time. They are held in storage at 10 deg. F.

The plans for freezing Georgia peaches were conceived several years ago as a possible way of curing the overproduction evil during the short maturity season, as the soft texture of the fruit makes them unsuitable for canning. Experimental packs were made last year by W. R. Tucker, agricultural development agent for the Atlanta, Birmingham & Coast Railroad, and the Georgia Power Company and State Agricultural Experiment Station also co-operated in the work. Results at that time justified the commercial development.

The plant was built in less than 40 days in an effort to get into production as soon as possible on this years' crop. A further discussion of the operation of the freezing system at this plant will appear in a coming issue of FOOD INDUSTRIES.

COMING EVENTS

AUGUST

25-30 — Pan - American Reciprocal Trade Conference, Sacramento, Calif.

SEPTEMBER

8-12—American Chemical Society, Hotel Gibson, Cincinnati, Ohio.

11-13—International Fisheries Convention, Montreal, Que.; Canadian Fisheries Association; United States Fisheries Association.

22-26—International Bakery Conference and Exposition, Atlantic City, N. J. American Bakers' Association; American Society of Bakery Engineers; Bakery Equipment Manufacturers' Association; New York State Association of Manufacturing Retail Bakers.

29-30, Oct. 1—National Chain Store Association, Chicago, Ill.

OCTOBER

5-7—National Poultry, Butter, and Egg Association, Chicago, Ill.

15-16—American Cheese Makers' Association, Thorpe, Wis.

11-19—National Dairy Exposition and St. Louis Fair, St. Louis, Mo.

20-25—Dairy Industries Exposition, Cleveland, Ohio. International Association of Milk Dealers, Hotel Statler, Oct. 20-22; International Association of Dairy and Milk Inspectors, Hotel Statler, Oct. 22-24; International Association of Ice Cream Manufacturers, Hollenden Hotel, Oct. 23-25.

27-29—Mayonnaise Products Manufacturers' Association of America, Chalfonte-Haddon Hall Hotel, Atlantic City, N. J.

Thirty Candy Firms Charged With Lottery Practices

THIRTY manufacturers of candy and chewing gum, including a number of the most prominent companies in the country, have been charged with conducting lotteries by the Federal Trade Commission, according to a statement issued on July 19.

Most of the complaints appear to center around games of chance used in the sale of penny and bar goods. One of the schemes mentioned in this connection consists in including a series of numbers within the wrapper of the bar. Those purchasing bars containing specified numbers received the candy at 1, 2, 3, or 4c., instead of the usual 5c. price. Such schemes are held by the Commission to be unfair methods of competition.

Food Trade Associations Aid Arbitration Group

AMONG the group of over 300 trade associations now linked in a national system for the arbitration of trade disputes without recourse to the courts, organizations in the food field occupy a prominent place, it is revealed in the third annual report of the American Arbitration Association.

The success of this means of settling difficulties without the expense, publicity, and ill-feeling of court action is illustrated by the fact that of the 344 cases submitted for arbitration in 1929 in its New York City tribunals alone, only four appeals were made in court to have the arbitrator's award set aside. In three of these cases the courts upheld the previous decisions, and the other case is still pending.

In the report, Lucius R. Eastman, president of the association, urged careful preparation of agreements.

Among the organizations participating in the educational work of the association and identified with the arbitration system are the Biscuit & Cracker Manufacturers' Association, Green Coffee Association of New York City, National Food Brokers' Association, National Wholesale Grocers' Association, Quality Bakers of America, Cocoa Merchants Association, and the National Confectioners' Association.

The American Bottlers of Carbonated Beverages, Federated Fruit and Vegetable Growers, and the National Macaroni Manufacturers' Association also are affiliated with the Arbitration Association.

Tariff Rates on Foodstuffs May Be First To Be Altered Under Flexible Clause

By Paul Wooton
Washington Correspondent

WITH tariff flexibility coming to a showdown, foodstuffs are most important among the items scheduled for investigation. There is definite hope that the general rate trend will be downward under the Tariff Commission action. Rates were shoved ruthlessly skyward through the whole field of farm products during the late siege of political tariff making, and many probably will be found vulnerable when scientific adjustment comes into play.

Although flexibility has been with us since 1922, without much effect, there is little doubt that the new law really means something in this respect. Heretofore, political barriers and wooden regulations stood in the way; now the political situation and the general turn of sentiment toward lower rates give promise that the strengthened flexible section will be used to the utmost. As under the Fordney-McCumber Act, flexibility is the power to raise or lower a rate by 50 per cent for the purpose of equalizing the competitive advantage between foreign and domestic goods.

The reason this did not work before is that the Tariff Commission reports had to be based on actual cost of production surveys all over the world. Invoice or wholesale value now can be substituted on the foreign goods. Instead of simply reporting the facts, the Tariff Commission will recommend final rates, which the President can accept or veto but not change. Broad authority is given in the power to consider "other relevant factors" than cost and transportation in rate making. If a 50 per cent change on an *ad valorem* rate is not enough to equalize costs, power is given, as in 1922, to base the duty on the higher American selling price rather than on foreign valuation.

Just how the broadened jurisdiction will be used depends somewhat on the make-up of the new Commission, which will have to be appointed before the middle of August. It seems certain, however, that an effort will be made to speed up investigations, establish a definite procedure, and shape new rates on as nearly a scientific basis as possible.

Already the Commission is heavily loaded with work, mostly at the request of Congress, whose resolutions are virtually equivalent to orders.

Here are the food items up for Commission report. Private industry has asked downward revisions on: soups, by the Campbell Soup Company; green peppers and fresh tomatoes, by several groups of produce dealers; maple sugar and maple sirup. Congressional requests cover: sugar; the differential for sugar refining, which is lower than in the old law and is felt to encourage Cuban refineries; and canned tomatoes. An investigation has been ordered on coconut oil and copra from the Philippines and other producing regions; palm oil, palm kernel oil, whale oil, rapeseed oil, perilla oil, and sesame oil, with a statement of the principal uses and of the kinds and quantities of domestic oils and fats replaced in domestic industry by such imports. Most of these items are free-listed if denatured and so are out of reach of flexible action, but some of the edible varieties bear duties. The Commission is starting immediately on an investigation of the entry of fish or other marine products from vessels owned, chartered, leased, or rented wholly or in part by aliens, whether or not domiciled in the United States.

Expansion is under way also in the Bureau of Customs, the powers of which have been broadened and liberalized to make entry of goods easier for collector, shipper, and importer alike. Candy manufacturers are aided by permission to import sugar under bond and obtain a drawback of duty for that used in exported products.

Getting back to flexibility, it is obvious that the Commission is so loaded with work that any new requests to benefit the industry will hold over for some time before they can be handled. However, now is the time to prepare cost data for any desired change. On border-line cases, it may be wise to withhold requests until it is clear just how the procedure will be shaped and what is to be expected. Otherwise, there is some incentive to file early, in order to obtain quick relief.

To show definitely what the tariff has done in foodstuffs, the following table has been prepared to cover the items of major import:

Tariff Changes on a Percentage Basis Affecting Items of Foodstuffs Interest Imports of Which in 1928 Exceeded $500,000

Paragraph	Item	Value of 1928 Imports in Thousands of Dollars	Actual or Computed ad Valorem Rate, Per Cent 1922	1930
	CHEMICAL SCHEDULE			
19	Casein	3,674	19.47	42.83
41	Glue, glue size, and fish glue valued under 40c. a pound	798	37.25	48.00
53	Olive oil weighing with container under 40 lb	9,114	40.54	51.35
54	Sesame oil, edible	668	Free	28.14
54	Soybean oil	777	40.52	56.73
90	Potato starch	609	49.45	70.64
	SUGAR SCHEDULE			
501	Sugar: under general tariff	1,335	78.99	88.03
	From Cuba	159,937	72.59	82.33
502	Blackstrap molasses: under general tariff	1,363	4.53	4.98
	From Cuba	8,523	3.68	4.04
	Total for sugar schedule	174,760	67.85	77.21
	AGRICULTURAL SCHEDULE			
701	Live cattle	20,058	19.08	33.84
	Beef	4,774	25.60	51.20
	Veal	1,372	17.33	34.65
703	Fresh pork	1,475	3.90	13.02
	Hams, bacon, and shoulders	900	5.64	9.16
	Pickled, salted and other cured pork	987	5.11	8.31
706	Canned beef	6,437	20.00	49.15
	Meats, prepared or preserved n.s.p.f	1,777	20.00	50.07
	Beef and veal, pickled or cured	999	20.00	50.79
	Edible offal (livers, sweetbreads, etc.)	532	20.00	42.37
709	Butter	1,562	33.30	38.84
710	Cheese	18,646	25.31	35.42
712	Poultry, dressed or undressed	1,467	22.48	37.46
713	Egg items increased	1,572	32.63	58.96
717-21	Fish items increased	1,874	11.50	27.20
724	Corn	617	13.96	25.26
727	Rice items	1,214	38.90	48.51
730	Bran shorts, byproduct feeds from milling wheat	8,019	7.50	10.00
	Linseed oil cake	1,211	Free	13.84
	Soy bean oil cake and oil-cake meal	1,920	Free	15.13
737	Cherries, sulphured or in brine, stemmed and pitted	1,561	21.05	66.67
740	Figs, fresh, dried, orin brine	2,305	26.53	66.32
743	Lemons	2,190	63.68	79.60
744	Olives, ripe, dried	558	36.73	45.91
747	Cuban pineapples	1,804	11.97	21.28
756	Sweet almonds, shelled	6,259	39.11	46.09
756	Chestnuts, including marrons	1,055	Free	7.11
757	Cream or Brazil nuts: Unshelled	2,141	9.84	14.76
	Shelled	1,039	2.85	12.82
761	Filberts Unshelled	1,300	24.51	49.01
	Shelled	980	29.16	58.32
757	Pistache nuts	559	2.83	9.90
759	Peanuts Shelled	2,138	72.74	127.30
	Unshelled	475	67.12	95.09
760	Walnuts of all kinds Unshelled	1,772	32.97	41.21
	Shelled	4,551	43.67	54.59
761	Edible nuts n.s.p.f (including cashews)	1,210	4.06	8.43
762	Flaxseed or linseed	31,245	22.50	36.57
765	Dried beans	5,640	38.36	65.76
768	Mushrooms Canned	1,428	45.00	70.31
	Dried	542	45.00	57.90
769	Green peas	713	20.08	60.25
769	Chick peas or garbonzos, dried	3,353	Free	29.60
770	Onions	2,663	47.11	117.78
771	White potatoes	3,171	35.11	52.66
772	Tomatoes in natural state, general tariff	5,227	15.71	94.28
	Tomatoes From Cuba	768	12.27	73.63
	Tomatoes Canned	5,233	15.00	50.00
	Tomatoes Paste	1,036	40.00	50.00
773	Turnips	836	21.60	44.90
772	Peppers in natural state	654	25.00	102.72
777	Chocolate and cocoa items increased	7,753	4.03	7.50
781	Mustard seed, whole	837	18.45	36.90
	Mustard, ground or prepared, bottled or otherwise	1,115	14.22	17.77
	Total increases, Agricultural Schedule*	231,749	19.49	39.30
1768	Decreases on spice seeds, unground	13,130	8.77	Free
	Total decreases, Agricultural Schedule	20,338	18.44	11.05
	TOTAL, AGRICULTURAL SCHEDULE*	282,418	22.71	35.07

*Including raise from free list to 24.06 per cent on $30,980,000 worth of long-staple cotton.

Congress Enacts Important Food Laws; More May Pass in December

PERHAPS no single Congress has passed so much legislation of interest to the food industries as that which in July concluded its second session. More is in prospect at the third session which convenes in December. This legislation has not been confined to broad measures such as farm relief and the tariff, which, for better or worse, will have a profound effect upon the food industries in common with others, but has extended to measures specifically designed either to promote or to regulate the food business.

Foremost among the new laws directly affecting the food industries is the Mapes-McNary bill providing that all classes of canned food, excepting meat and meat food products and canned milk, not meeting minimum standards to be established by the Department of Agriculture must be labeled as substandard. This bill was finally enacted in the closing days of the session after an abortive attempt was made to include a provision that, if used, the presence of corn sugar need not be declared on the label.

The Food and Drug Administration now is formulating tentative standards for corn, tomatoes, and peas, the three great canned staples. Already letters asking help in formulating the standards have been sent to canners and to distributors' and consumers' organizations. Public hearings will be held in all instances before promulgation of any standards or any designations intended to describe products which fall below such standards.

Of wider significance to the canning industry than is generally supposed is the new Perishable Agricultural Commodities Act, otherwise known as the Borah-Summers law, imposing penalties for fraudulent practice in marketing fresh fruits and vegetables and requiring that commission merchants, brokers, and dealers must obtain federal licenses to continue in business after Dec. 10, 1930. Recognizing that Congress did not have canners in mind when enacting this law, the Department of Agriculture, generally speaking, has left their status under this law to be settled later. Canners who regularly buy and sell fresh fruits and vegetables clearly come within its provisions, in the department's opinion, and will be expected to apply for licenses. Thus, canners who buy whole crops, sort out the grades desired for canning, and sell the rest will be classed as dealers.

As to canners who may occasionally dispose of surplus produce, the department is not prepared to take a position. Canners who do not resell any fresh fruits and vegetables are the only ones that are definitely exempt from the provisions of the law.

The department now is receiving applications and issuing licenses. Regulations in course of preparation will be submitted to the trade at hearings to be held in New York and Chicago during August. The initial appropriation for carrying the law into effect is no more than sufficient to cover the expense of issuing licenses. No investigatorial work will be undertaken before regular appropriations are provided at the next session of Congress, but in the meantime the department will act on complaints received and impose penalties for violation of the act. Such orders may be contested, but the department's findings will be *prima facie* evidence in federal courts.

Amended to become effective in twelve months instead of six months, the bill extending the taxes imposed upon margerin by the Oleomargerine Act, to vegetable cooking compounds alleged to be competitive with butter, was approved July 10.

Some doubt attaches to the constitutional validity of the new-plant patent law approved May 23, but the Patent Office and the Department of Agriculture are studying plans for its administration. Up to July 23, one application had been received. The question as to the constitutionality of the law arises from the indefinable contribution that is made by nature in the development of the new variety.

Several food bills fell short of final enactment in the last session, but it is probable that one of them, at least, the Jones-Haugen preserve standards bill, will be placed on the statute books during the short session which convenes in December. Desired by manufacturers of genuine preserves, jelly, and jam, to protect them from the competition of so-called imitation products deficient in fruit content, this bill has passed the Senate and is practically assured of early consideration in the House under a special rule granted toward the close of the recent session.

As a result of the plea by corn-sugar interests that the use of corn sugar should be permitted in such products without declaration on the label, the same as cane or beet sugar, the bill as amended by the House Committee on Agriculture and passed by the Senate now provides that all the sugar used, regardless of kind, must be declared on the label and that the presence of added pectin and fruit acids also must be made known. The latter requirement is opposed by the National Preservers' Association, sponsor of this legislation, but is acceptable to the Food and Drug Administration.

Passed by the House for the third time in its long legislative career, the slack-fill package bill is reposing in the Senate Committee on Agriculture with prospects uncertain for its consideration at the December session. This bill, which has the Department of Agriculture for its direct sponsor, would provide that slack filling of food containers in such a manner as to deceive or mislead purchasers is a violation of the Food and Drugs Act. The bill subjects to condemnation packages which, in the judgment of the department, are shaped in such a manner as to be deceptive of the quality, quantity, size, kind, or origin

What Congress Did to the Food Laws

No. and Sponsor	Subject	Purpose	Date Effective
New Laws			
Public Law No. 538 (H. R. 730, Mapes).	Compulsory canning standards	Amends Food and Drugs Act to provide that canned goods falling below standards to be established by Department of Agriculture must be labeled to indicate inferiority.	July 8, 1930.
Public Law No. 540 (H. R. 6, Haugen).	Vegetable cooking compounds.	Brings so-called artificial cooking compounds resembling butter within tax and regulatory provisions of Oleomargarin Act.	July 10, 1931.
Public Law No. 325 (S, 108, Borah).	Marketing of fresh fruits and vegetables	Requires commission merchants, brokers and dealers to obtain federal license by Dec. 10, 1930, and imposes penalties for rejection of shipments, dumping, misrepresentation, and other fraudulent practices.	June 10, 1930.
Public Law No. 245 (S. 4015, Townsend)	Plant Patents.	Authorizes patenting of new varieties plants produced by budding and grafting.	May 23, 1930.
Bills Pending on Floor			**Status**
H. R. 11514 (Haugen)	Statutory standards for preserves, jams and jellies.	Provides that preserves, jams and jellies not conforming to specified proportions of fruit and sugar shall be labeled "Imitation."	Passed Senate; pending in House under special rule.
S. 101 (Walsh, Montana)	Protein content of wheat.	Authorizes annual surveys of protein content of hard wheat crops to determine proper premiums.	Passed Senate; pending on House calendar.
Bills Pending in Committee			
H. R. 8 (Haugen)	Slack-filled packages.	Declares slack filling of food containers to be in violation of Food and Drugs Act and condemns packages of deceptive shapes and sizes.	Passed House; pending in Senate Committee on Agriculture.
H. R. 3921 (Hope)	Permissive canning standards.	Would provide for establishment of permissive standards for all grades on canned foods.	Pending in House Committee on Agriculture.
H. R. 146 (Lea, California)	Inspection of poultry and poultry products.	Similar to Meat Inspection Act; to provide for inspection of poultry at slaughtering, packing and canning plants.	Pending in House Committee on Agriculture.
H. R. 13137 (Vincent, Michigan)	Foreign-grown canned vegetables.	Declares canned foods containing foreign-grown vegetables to be misbranded unless country of origin is specified on label.	Pending in House Committee on Agriculture.
S. 1468 (Smoot)	Advertising of food and drug products.	Includes tobacco products under Food and Drugs Act and extends law to cover advertising of food and drug products.	Pending in Senate Committee on Agriculture.

of the contents, with due allowance for shrinkage and expansion. Food and Drug Administration officials are confident that this measure eventually will become law. They say that practically the only organized opposition remaining is from the bottle industry.

Closely related to the new compulsory canning standard law requiring that sub-standard canned foods must be so labeled is the Hope bill proposing establishment by the Department of Agriculture of permissive standards for all grades of canned foods. This also has an uncertain future. Food-law officials approve the bill in principle, but prefer that this more elaborate legislation wait, at least, until some experience is gained under the new Mapes law.

Several other bills that await further action when Congress reassembles in December are shown in the table on the preceding page.

Packaged Meats Are Praised And Condemned

PACKAGED meats, both fresh and frozen, were alternately lauded and condemned at a turbulent open meeting held in New York City on June 26 under the auspices of the New York Food Marketing Research Council. Both Frank L. Parsloe, of H. C. Bohack & Company, and Marion Harper, of General Foods Corporation, cited the results of sales experience as economic justification for packaged, pre-cut meats. They differed, however, as to the present advisability of quick-freezing the packaged product. Papers presented by Mr. Parsloe and Mr. Harper paved the way for an interesting economic discussion of the value of freezing in this connection, but opposition to any form of packaging consumer cuts phrased in vehement generalities by George Kramer, president of the National Association of Retail Meat Dealers, diverted the meeting from the facts previously presented. Before adjournment, opponents of the new methods of meat distribution had called it "just a fad," advocates had predicted universal packaging within two years, and logical evaluation of actual merchandising experience became impossible.

The first speaker of the meeting, G. M. Troutman, of Swift & Company, Inc., told of the progress made by that organization with frozen consumer cuts.

The value of packaged meats in making possible scientific price determination on the part of the retailer, was emphasized by B. F. McCarthy, senior marketing specialist of the U. S. Department of Agriculture, Bureau of Agricultural Economics.

The speech of Frank L. Parsloe, comptroller for H. C. Bohack & Company, Brooklyn, N. Y., was the most specific of the afternoon. It left no doubt in one's mind that handling of meats in chain stores, with a market area similar to that of Bohack's is undoubtedly more satisfactory in the packaged form. Difficulties of securing accurate cost control in their markets in Brooklyn, N. Y., led this company to try packaged meats in an experiment that began last February. They believe that complete visability is necessary and consequently wrapped the cuts in moisture-proof cellophane. This wrapping makes the meat look even more attractive than in its natural fresh-cut condition, Mr. Parsloe contended.

One of the chief difficulties lay in the method of transporting the meat from cutting centers to stores. They now use a metal-lined pine box refrigerated with solid CO_2, which holds the temperature at 34 deg. F. for six hours and is easily handled. Each dealer's supply is loaded into one of these boxes each morning, in accord with his order the night before, and is left in front of the store or delivered within the store in the same manner that bread is handled.

Every retailer gets a supply of meat every 24 hours in accord with his orders of the night before, and none is sold after 48 hours. When questioned later as to the percentage of returns, he said they were "very small." The money saved by large-scale cutting at a centralized plant more than pays for wrapping materials and labor, he said. Mr. Parsloe expressed a wish that no manufacturer would attempt to package any meat except that of highest quality; at least, not until the public had become used enough to the innovation to realize that it was the original steer and not the method of distribution that was at fault when a poor piece came along.

Marion Harper, vice-president of the General Foods Sales Company, who is in charge of the sales test of Birdseye Frozen Foods at Springfield, Mass., said that quick-frozen package meat offered all the advantages of fresh packaged meat plus a few more. Mr. Harper predicted that sooner or later a big percentage of the meat supplied to the nation will be marketed in a packaged, quick-frozen form. In stating the advantages which the frozen product has over the packaged fresh product, Mr. Harper brought out the fact that all classes of frozen products may be sold from the same case, that the problem of spoilage and return is practically eliminated, that long-distance shipments are more possible, and that a larger variety can be handled, because it is not necessary to dispose of them so quickly.

Business Conditions Turn Toward Normal

ACCORDING to figures compiled by *The Business Week*, the last four weeks have seen a definite tendency toward improvement in the general business situation. The index number compiled by that publication was at a low of 88.8 per cent of normal the last week in June. On July 2 it had risen to 93.6 per cent. On July 16 the index was just short of normal, while for the next week it had fallen slightly to 97.2 per cent of normal.

In commenting on this rise of the business index, *The Business Week* said, in its July 2 number: "The business tide reached its ebb during the past two weeks, and is beginning to turn. . . . Progress will be slow, irregular, spasmodic, with sporadic relapses, successively less frequent and sharp, till the end of July. Then in the same weeks when a year ago the downturn began, a decisive recovery will set in. . . . The rise of the business curve thereafter will be rapid. . . . By October it will be back to normal."

On July 23, the same source said: "The passing of the mid-year spurt, marked by unusually high levels of building contracting and money turnover, has left business facing the full force of the usual July slackness, now emphasized by a depression year. . . . Our index, after touching normal for a brief period, has receded, as expected, to 97.2 per cent. . . . Industrial activity, apart from building, is at the lowest level of the year, but general trade, though slackening somewhat with the season, continues well sustained in comparison with production. Commodity prices, except in key agricultural products, show greater steadiness here and especially abroad. The stock market is putting up encouraging resistance to further liquidation . . . and business sentiment has a better tone."

New York City Health Board Eases Ban on Skim Milk

AN AMENDMENT easing a regulation that formerly prohibited the transportation of skim milk within the city limits except in hermetically sealed cans of not more than 8 fluid ounces was approved by the New York Board of Health on July 1.

Modification of the ruling, which originally was designed to prevent fraud and adulteration in the distribution of whole milk for retail purposes, now permits the transportation and sale of skim milk for manufacturing purposes only. Sales may be made only after an application telling the source of supply and the proposed use of the milk is approved by the Board of Health. Furthermore, the purchaser must supply his own cans, painted a bright yellow, and his own trucks to transport it.

The alteration in the ruling is said to have been occasioned by the construction of a margarin plant in Brooklyn, N. Y. Not until the plant was ready to begin operations was it discovered that the skim milk necessary could not be obtained except in half-pint cans. Permission to obtain the milk in a logical manner was obtained when it was shown that there would be no danger of diversion to retail channels.

Interest at Macaroni Makers' Convention Centers on Advertising Plans

THE four-year co-operative advertising campaign which will be launched by the National Macaroni Manufacturers' Association next month, received the enthusiastic support of representatives at the twenty-seventh annual convention, held at Niagara Falls, June 24 to 26. It was announced that $1,320,700 had been raised at the time of the convention for the advertising fund, and that $1,500,000 was expected to be available when the campaign got under way. A proposal ratified at the gathering limits membership in the association after Jan. 1, 1931, to subscribers to the fund. Under this new ruling, there will be 90 active and 29 associate members. Dues will be taken from the money subscribed to the advertising campaign.

Objection on the part of Food and Drug Administration officials to the use of the word "energy" as planned for the advertising, came in for a good deal of discussion. Although it was pointed out that caloric energy, rather than therapeutic energy, was implied in the term, the consensus seemed to be that it was inadvisable to use the "energy trio" emblem on packages or cartons of macaroni products. The fact that the emblem might be mistaken for a trademark, or viewed as a mark indicating equal quality for the products of all manufacturers using it, was a factor in this decision. No modification of the use of the "energy trio" mark in other advertising, however, was felt to be necessary.

The means for obtaining the high-quality product that will justify this expensive advertising also came in for a good share of attention at the convention. An address entitled "Improving Macaroni Wheats," by H. R. Sumner, executive secretary of the Northwest Crop Improvement Association, was exceptionally interesting. He described the work that is being done by farmers to improve the quality of durum wheat by eliminating mixed and inferior seeds and also the care taken in milling semolina flour. A number of other papers on the improvement of raw materials were given at this time.

A discussion of the organized campaign for increased safety in macaroni plants, started under the leadership of David Cowan, of A. Goodman Sons, New York City, also was a feature of Tuesday's session. The possibility of effecting a big saving in the industry by a campaign to reduce accidents was emphasized.

In his report as chairman of the cost committee, G. G. Hoskins recommended the adoption of a uniform cost system for the industry. About 26 firms pledged themselves to modify their own cost system to the association standard, and it was planned to start active work along these lines immediately.

In a closed session on Thursday, June 26, it was voted to increase the board of directors from nine to twelve. After the election of the additional directors made necessary by this increase, officers for the coming year were elected by this body from their own membership, as provided in the by laws of the organization.

Macaroni Manufacturers' Officers

Frank L. Zerega, president, A. Zerega's Sons, Inc., Brooklyn, N. Y.

G. G. Hoskins, vice-president, Foulds Milling Company, Libertyville, Ill.

F. J. Tharinger, advisory officer, Tharinger Macaroni Company, Milwaukee, Wis.

G. La Marca, director, Prince Macaroni Manufacturing Company, Boston, Mass.

C. B. Schmidt, director, Crescent Macaroni & Cracker Company, Davenport, Iowa.

Wm. Culman, director, Atlantic Macaroni Company, Long Island City, N. Y.

F. S. Bonno, director, National Macaroni Company, Dallas, Texas.

John Ravarino, director, Rarino & Freschi Importing & Manufacturing Company, St. Louis, Mo.

Louis S. Vagnino, director, Faust Macaroni Company, St. Louis, Mo.

G. Guerrisi, director, Keystone Macaroni Manufacturing Company, Lebanon, Pa.

Henry Mueller, director, C. F. Mueller Company, Jersey City, N. J.

F. A. Ghiglione, director, A. F. Ghiglione & Sons, Seattle, Wash.

Alfonso Gioia, director, A. Gioia & Brother, Rochester, N. Y.

B. R. Jacobs, Washington representative, Washington, D. C.

M. J. Donna, secretary-treasurer, Braidwood, Ill.

Statistics Being Gathered For Preserve Industry

PRODUCTION and distribution statistics for preserves, jams, jellies, marmalade, and fruit butters are now being gathered by the foodstuffs division of the U. S. Department of Commerce in a national survey being carried out with the co-operation of the National Preservers' Association. Although the industry does an annual business of over $38,000,000, this is the first time that any comprehensive inquiry of this kind has been made.

The questionnaire, which is now in the hands of the manufacturers, calls for precise data as to the annual production of standard (pure), substandard (compound), and imitation compositions. Data as to channels of distribution used and variations in type and quality of products sold with geographical divisions is also sought.

The results will be of value, it is felt, not only to the manufacturers of preserves themselves but to others concerned in the trade, such as growers of fruit. Of course, all records are handled in complete confidence, only the totals being made public.

Corn Sugar Labeling Subject of Hearing

A DISCUSSION of the requirements for labeling food products containing corn sugar held on July 25 at the office of Secretary Hyde, of the U. S. Department of Agriculture, produced little new evidence on which to determine whether, to use Mr. Hyde's own words, any benefit would result from a waiver of the present regulation and how far, if at all, a change in that regulation ought to go. Four hours' testimony for and against permitting indiscriminate use of dextrose was largely reminiscent of the debate that has continued ever since refined corn sugar was first commercially exploited in 1923.

Spokesmen for the corn-sugar manufacturers argued that as sucrose is converted into levulose and dextrose when taken into the stomach, dextrose is a wholesome, nutritious, and necessary food. They contended that as this change also occurs to a considerable extent during the process of manufacturing food products in which sucrose is used, there is no good reason for requiring a label declaration when dextrose is used in the first instance.

Opponents of any relaxation in the Food and Drug Administration's policy conceded that corn sugar is a wholesome, nutritious product but contended that sugar invariably means sucrose to the consuming public.

Frank E. Gorrell, secretary of the National Canners' Association, stated that the use of sucrose in the canning industry is universal and expressed the opinion that the unrevealed substitution of corn sugar would be contrary to the spirit of the law. Dr. W. D. Bigelow, director of the National Canners' Association's research laboratory, said exhaustive tests had demonstrated that corn sugar is not satisfactory when used as a sweetener in canned fruits and vegetables.

Dextrose has certain advantages over sucrose, according to Dr. W. H. Eddy, director of the Bureau of Food and Sanitation of *Good Housekeeping*, but he argued that even if deception benefits it is still deception. Because the use of corn sugar is permitted in a few classes of food products without labeling is no argument that it should be admitted to 20 classes; on the contrary, said Dr. Eddy, all products containing corn sugar should be labeled.

Prize-winning window display of glass-packed foods

Los Angeles Company Wins Glass-Packed Food Display

THE grand national prize of $1,000 for the best window exhibit of foods packed in glass was won by Young's Market Company, Los Angeles, Calif., it was announced by the judges a few weeks ago. This contest was sponsored by the Glass Container Association to demonstrate the sales value of the eye-appeal of glass-packed products.

Photographs of competing windows were used by the judges in ascertaining the most attractive display. Prizes were first awarded for the best displays in nine geographical divisions, and the national winner was chosen from these. Total awards of $9,135 were made.

TRADE NOTES

AMERICAN BISCUIT COMPANY, San Francisco, Calif., a subsidiary of the National Biscuit Company, has purchased the Mutual Baking Company. The American company and the Mutual have been working since Sept. 1, 1929, under an agreement under which American baked Mutual's output. The Mutual has been doing an annual business of between $400,000 and $500,000.

ANGELUS-CAMPFIRE COMPANY has recently been incorporated at Dover, Del., indicating a merger of the marshmallow-manufacturing business of the Campfire Corporation and the Crackerjack Company, both of Chicago, Ill. The charter of the new organization provides for a capitalization of $1,000,000 in preferred stock and 60,000 shares of common stock.

BEGLEY FOOD PRODUCTS COMPANY, Chicago, Ill., has been acquired by the Hygrade Food Products Corporation. A complete line of food products packed in tin and glass will be put out by the subsidiary under the management of M. M. Pivitz.

COFFEE PRODUCTS OF AMERICA, INC., Los Angeles, Calif., a new holding company in which are grouped the Joannes Corporation, Puritas Tea & Coffee Company, and San Diego Coffee Company, has completed arrangements for the acquisition of Newmark Brothers. The group does a combined business of between $5,000,000 and $6,000,000 a year, and it is planned to acquire a number of other coffee houses and build up a nation-wide sales program.

CONESTOGA CHEESE MANUFACTURING CORPORATION formally opened a new plant at Lima, Ohio, on July 4. Four kinds of soft cheese will be made at the plant, which will be managed by S. Silberman, formerly manager at the Evansville (Wis.) plant of the company.

KELLEY ICE CREAM COMPANY, Sandusky, Ohio, recently changed hands when a controlling interest in the stock was purchased by Grove C. Lauritzen and Edward G. Windau, of that city. Mr. Lauritzen has been elected president to succeed Gordon J. Gleim.

KREUSCH ICE CREAM COMPANY, Anderson, Ind., has been absorbed by the Beatrice Creamery Company, Chicago, Ill. Elmo Funk will continue as plant manager.

LANGENDORF UNITED BAKERIES, INC., San Francisco, Calif., has announced the purchase of the Mackechnie Baking Company, of Los Angeles, Calif. The transaction gives the company two Los Angeles plants and follows closely after the acquisition of the Davidson Baking Company, of Seattle, Wash. The Mackechnie Baking Company was one of the oldest in Los Angeles, doing an annual business of approximately $600,000. Langendorf's Los Angeles production will be increased to approximately 60,000 lb. of bread daily by the change. The Los Angeles purchase was consummated from cash and working capital on hand, as was the recent Seattle acquisition, so that no new financing was required, it was announced.

OGDEN FLOUR MILLS, Ogden, Utah, a branch of the Globe Grain & Milling Company, plans the immediate establishment of a branch warehouse and blending plant at Little Rock, Ark. The branch will be under the management of V. P. Campbell, formerly sales manager of the Topeka Flour Mills Corporation. Flour from the Ogden mills will be shipped to the new plant to be blended.

SISKIYOU MILK & CHEESE COMPANY, Weed, Calif., has been recently organized, and is making preparations to manufacture cheese and to can goats' milk from pure-bred Toggenberg goats. The company has a capital stock of $40,000.

SKINNER, SHERMAN & ESSELEN, INC., Boston, Mass., consulting chemists and engineers, will become Skinner & Sherman, Inc., on Aug. 1, G. J. Esselen having resigned. The consulting practice of FREDERIC C. CLARKE, South Manchester, Conn., who has joined the organization, is now included. Burton G. Philbrick, who for many years has been in charge of its bacteriological department, and Mr. Clark have been elected vice-presidents; and Mr. Wilder A. Chapman, in charge of its analytical and metallurgical work, has been elected secretary.

WARNER BROTHERS PICTURES, INC., well-known motion-picture producers, have established a subsidiary company, Warner Brothers Industrial Films, Inc., to make and distribute two types of commercial pictures. One type will show manufacturing processes, sales ideas, and the like, for business purposes. The second type will be "sponsored pictures," devoted primarily to entertainment but having distinct advertising value, to be shown as a part of the program in ordinary theatres.

WILLIAM WRIGLEY, JR., COMPANY has sold an 18½-acre tract at Newton Creek, between Brooklyn and Queens, N. Y., to H. C. Bohack Company for a $2,000,000 terminal project. An inoperative chewing-gum plant is now located on the property.

PERSONALS

F. W. BRYCE, president of the Atlantic Coast Fisheries Company, has returned from a trip to Europe.

ELTON F. CORNELL, of the National Canners' Association laboratory at San Francisco, has resigned to enter the research department of the Hawaiian Pineapple Company, Honolulu, T. H. LOUIS G. PETREE, formerly of the Food, Drug and Insecticide Administration laboratory, Seattle, Wash., succeeds Mr. Cornell at San Francisco.

HARRY J. EUSTACE, Berkeley, Calif., prominent agricultural economist, became chief of the division of markets of the California Department of Agriculture on July 1.

ROGER B. FARQUHAR has been elected president and chairman of the board of T. M. Duche & Sons, New York City, importers of confectionery supplies.

ROY M. HAGEN, for the past three years managing director of the Western

Cattle Marketing Association, San Francisco, Calif., has been appointed assistant general manager of the Sun-Maid Raisin Growers of Delaware, Fresno, Calif. Mr. Hagen is well known in co-operative organizations on the Pacific slope, having been secretary of the livestock advisory committee of the Federal Farm Board, president of the Western Cattlemen's Supply Company, and secretary of the California Cattlemen's Association.

R. A. HAVENS, who has been associated with the Snider Packing Corporation at Albion, N. Y., and Marion, Ind., has joined the staff of the commercial laboratories operated at Indianapolis, Ind., as the technical division of H. E. Barnard, Inc.

RAYMOND HERTWIG, formerly in the research department of Hecker H-O Company, Inc., is now secretary of the committee on foods of the American Medical Association.

BISMARCK HOUSSELS, vice-president of Van Camp Sea Food Company, Inc., was elected president, succeeding Frank Van Camp, resigned.

LOWELL B. KILGORE has been appointed research fellow by the Mayonnaise Products Manufacturers' Association of America to work in co-operation with the U. S. Department of Agriculture at the Bureau of Chemistry and Soils. He was formerly engaged in research work at Johns Hopkins University.

S. H. KIM, formerly a graduate student at Northwestern University, is now with the Corn Products Refining Company at the Kansas City (Mo.) plant.

LOUIS LIEBERMAN, formerly superintendent of the Long Island City plant of Happiness Candy Stores, Inc., is now general superintendent of the candy manufacturing operations of W. F. Schrafft & Sons Corporation.

A. M. MERKENS, president of the Merkens Chocolate Company, Buffalo, N. Y., and B. DANGERFIELD, president of Neymer & Brothers, Inc., Pittsburgh, Pa., will act as delegates on the part of the United States at the International Congress of Chocolate and Cocoa Manufacturers, to be held at Antwerp, Belgium, September, 1930.

PAUL MILLER, formerly managing director of the western division of the General Ice Cream Company, located at Buffalo, N. Y., has been promoted to director of sales, with headquarters at Schenectady, N. Y. C. W. LARSON, former chief of the United States Dairy Bureau and formerly managing director of the National Dairy Council, will succeed Mr. Miller at Buffalo.

HARRY Q. MILLS, formerly in charge of the West Coast offices of the Anchor Cap & Closure Corporation and the Capstan Glass Company at San Francisco, Calif., has been elected a vice-president of both companies, it was announced on July 23. Mr. Mills will initiate a new service of direct contact between the companies and their customers, and will have his headquarters at the general offices of the Anchor Cap organization at Long Island City, N. Y. HUGH CRAWFORD will succeed Mr. Mills in the Pacific Coast office.

THOMAS A. MORRISSEY, Los Angeles, Calif., was chosen secretary-manager of the newly formed California Fish Canners' Association at a meeting of the directors held in Los Angeles.

ARNO E. SANDER, of the York Caramel Company, York, Pa., was again re-elected president of the Pennsylvania Confectioners' Association at the annual convention last month. This is Mr. Sander's ninth consecutive term as president.

ARCHER C. SINCLAIR has been elected vice-president of Kingan & Company, Indianapolis, Ind. He is head of the branch house department of the company in his new position. Mr. Sinclair recently resigned from T. M. Sinclair & Company, Cedar Rapids, Iowa.

ELISHA WALKER, chairman of the board of the Transamerica Corporation and Bancamerica - Blair Corporation; ROBERT LEHMAN, of Lehman Brothers; and SIDNEY F. WEINBERG, of Goldman, Sachs & Company, have been elected to the board of directors of General Foods Company.

J. J. WILLIAMSON, chief of the chemistry division of the New York State Agricultural Experiment Station, has accepted a position as biochemist with Rohn & Haas Company, Philadelphia, Pa. He will transfer his affiliation on Oct. 1.

L. A. WOOLAMS, vice-president and treasurer of the California Packing Company, recently resigned to become a general partner in the Bancamerica-Blair Corporation.

GEORGE YIRELL, Chicago, Ill., for 45 years beef grader for Armour & Company, retired several weeks ago. He plans to devote considerable time to travel.

Heads New Laboratory

Bachrach

STROUD JORDAN, chief chemist of Henry Heide, Inc., New York City, and nationally known authority on the problems of the confectionery industry, has accepted the position of managing director of the Applied Sugar Laboratories, Inc., New York City, a general service laboratory recently incorporated to serve confectionery, baking, and other industries whose products depend upon the use of sugar. The organization has been brought about with the co-operation of the American Molasses Company and the Nulomoline Company, and will have as president C. W. Taussig, president of those two concerns. William Lohr, vice-president of American Molasses and Nulomoline, is vice-president of the new laboratory; E. F. Vyner is secretary-treasurer, and James A. King, N. Fuad, James P. Booker, and Frederic W. Harvey are technical directors.

Located at 111 Wall Street, the laboratory will be available on a fee basis to those who desire to make use of its facilities. It is being equipped with the apparatus necessary for scientific and technical research and will have a staff of chemists, engineers, and production men familiar with candy making, baking, bottling, and allied fields.

OBITUARY

HARVEY W. WILEY, outstanding crusader for pure-food regulation, died at his home in Washington, D. C., on June 30. He was 86 years of age. A review of the professional career of Dr. Wiley is virtually a résumé of the history of pure-food legislation in the United States. His unique position in the public service has been strikingly recognized by the unusual permission granted by the War Department for the placing of a special monument over his grave in Arlington National Cemetery on which will be inscribed the words, "Father of the Pure-Food Law." Dr. Wiley was born in Kent, Ind., Oct. 18, 1844, and attended Hanover College, Indiana Medical College, and Harvard University. He also was the recipient of many honorary degrees. His early professional career was in teaching, from which work he gradually took up public service, first as a state chemist for Indiana, from 1874 to 1883. On the latter date he became chief chemist of the U. S. Department of Agriculture, which position he held until 1912. It was during this long period of service on the staff of the federal government that he labored unceasingly for the enactment and subsequently as leader in the enforcement of the federal food and drugs law. After his retirement from active government service in 1912 Dr. Wiley continued in professional work as a writer and consultant. This activity was not interrupted until late in 1929, when failing strength compelled him to retire

Underwood & Underwood
Harvey W. Wiley

from the more arduous outside activities. However, it was not until the last few weeks of his life that he was compelled to discontinue active interest in the program of legislative matters and investigations in progress in the federal Congress.

W. M. ADAMS, manager of the New York branch of Sethness Company, Chicago, Ill., manufacturer of beverage flavors and concentrates, died suddenly on June 26. He was 58 years old and had been connected with the Sethness Company for 18 years.

CLARENCE L. BARTSCHE, president of the United Milk Company, Cleveland, Ohio, died at his home in Cleveland on July 15.

WILLIAM ELY, director and manager of the canned goods department of R. C. Williams & Company, New York City, died at his home in Hackensack, N. J., on July 6. Mr. Ely was 68 years of age. He had been connected with Austin, Nichols & Company before joining R. C. Williams & Company in 1916.

O. S. JORDAN, president of the Dairy & Ice Cream Machinery & Supplies Association, Inc., died on July 12 at his home in Rutherford, N. J. He had been president of the organization since 1919, and in 1928 was official United States delegate at the World's Dairy Congress in Great Britain. He was equally well known in the salt industry, having been secretary of the Sterling Salt Company until its recent merger with International Salt Company, and a partner of Brown & Shaw up to the time of its dissolution.

WILLIAM M. NEWSOME, senior vice-president of the United Fruit Company, died in Boston on July 1 at the age of 62. Mr. Newsome had been connected with the United Fruit Company since its organization in 1899. He was successively head salesman, manager of the West Indies department, and vice-president and president of a subsidiary, the Fruit Dispatch Company. He resigned this latter in 1925, and in recent years had occupied himself with the development of the United Fruit fleet and the building of new vessels.

WYATT W. RANDALL, associate in biochemistry in the School of Hygiene and Public Health at Johns Hopkins University, died in the Johns Hopkins Hospital, Baltimore, Md., on July 22 following an operation. He was 63 years of age. Mr. Randall was formerly connected with the Maryland State Department of Health, and had served on several commissions.

J. K. SMITH, for the past five years vice-president in charge of the Sperry Flour Company, San Francisco, Calif., died July 1 at the age of 68. Mr. Smith was formerly located at Spokane, Wash., where for ten years he was manager of the Sperry mill.

A. DONALD STEWART, Garden City, L. I., former vice-president of the Mavis Bottling Company, died on July 21 at the Nassau County Hospital, Mineola, L. I. Mr. Stewart had also been general sales manager and director of advertising for Ludens, Inc., Reading, Pa.

W. B. TIMMS, a member of the United States Food Commission during the World War, died on July 2 after a long illness at his home in Elizabeth, N. J. He was 74 years old. Mr. Timms was formerly head of the canned goods department and later assistant treasurer of Austin, Nichols & Company. He then resigned to become a partner in Warmington, Timms & Company, merchandise brokers.

New Construction

Bakery—Dugan Bros., 290 South 5th St. S., Brooklyn, N. Y., will receive bids after Aug. 1 for the construction of a 60 x 260 ft. bakery at White Plains. Estimated cost to exceed $150,000. H. Holder, 242 Franklin Ave., Brooklyn, is architect.

Bakery—Corp., c/o I. Robinson, 3489 Jerome Ave., New York, N. Y., awarded contract for the construction of a bakery and stores building at Beach Ave. and Merrill St. to Weeks Ave. Construction Co. Inc., 3489 Jerome Ave., New York. Estimated cost $50,000.

Bakery—U. S. Government, c/o A. W. Parker, Constructing Quartermaster, Schertz, Tex., will receive bids until Aug. 6 for the construction of a 1 story, 30 x 60 ft. bakery at Randolph Field, 14 mi. north of San Antonio. Estimated cost $32,000 including equipment.

Bakery—Valley Baking Co., Harlingen, Tex., awarded contract for the construction of a 1 story, 120 x 212 ft. bakery to Fogel Construction Co., 619 Reliance Bldg., Kansas City, Mo. Estimated cost $125,000.

Bakery — Van de Kamps Holland Dutch Bakery, San Fernando Bldg., Los Angeles, Calif., will soon award contract for a 2 story, 230 x 280 ft. bakery at Fletcher Dr. and San Fernando Rd. Estimated cost $250,000. McCormick Co., 41 Park Row, New York, N. Y., is architect.

Bakery—Westmont Bakery, 2918 Spruce St., Altoona, Pa., awarded contract for the construction of a 2 story, 45 x 47 ft. bakery to Reppert Construction Co., 1105 13th St., Altoona. Estimated cost $40,000.

Beverage Plant—Kiss Beverages Ltd., 121 West Ahrens St., Kitchener, Ont., plans the construction of a 2 or 3 story beverage plant. Estimated cost $100,000. W. H. E. Schmalz, 129 King St. W., Kitchener, is architect.

Bottling Plant—Coleman & Keating, 112 Sudbury St., Boston, Mass., awarded contract for the construction of a 2 story, 95 x 100 ft. bottling plant at Columbus Ave. Ext. to R. J. Gauvreau & Co., 11 Beacon St., Boston. Estimated cost $50,000.

Bottling Plant—Owner, c/o Miller & Levi, 46 Cornhill St., Boston, Mass., Archts., awarded contract for a 1 and 2 story, 100 x 195 ft. bottling plant at Armory and Columbus Ave., Roxbury, to Robert J. Gauvreau & Co., Inc., 11 Beacon St., Boston. Estimated cost to exceed $40,000.

Mineral Water Plant — American Mineral Water Co., 99 Somerset St., Newark, N. J., will build a 1 story, 50 x 100 ft. mineral water plant at 651 South 11th St. Estimated cost $40,000. M. E. Weiner, 45 Branford Pl., Newark, is architect.

Vinegar Plant — H. J. Heinz Co., 1062 Progress St., N. S., Pittsburgh, Pa., awarded contract for the construction of a vinegar plant including tank building, press building, etc., at Winchester, Va., to G. F. Hazelwood, Cumberland, Md. Estimated cost $85,000.

Candy Factory—Margaret Burnham Candy Co., 3800 Piedmont Ave., Oakland, Calif., had plans prepared for the construction of a 2 story factory at 46th Ave. and Telegraph St. G. Koster, 2355 Leavenworth St., San Francisco, is architect.

Canning and Packing Plant (Citrus)—Texas Citrus Fruit Growers Association, c/o J. H. Shary, Pres., San Benito, Tex., is receiving bids for the construction of a 2 story citrus canning and packing plant at Brownsville also at Harlingen. Estimated cost $70,000 each.

Cold Storage Plant — Apple Growers' Cold Storage Co., Watsonville, Calif., awarded contract for a 75 x 110 ft. addition to cold storage plant on Beach Rd., to P. T. Walstrom, 30 West Lake Ave., Watsonville, $49,950.

Cold Storage Plant, Bakery, etc.—Dept. of Public Welfare, H. H. Griswold, Dir., Columbus, O., will soon award contract for the construction of a group of buildings including cold storage plant, kitchen and bakery building, etc., on Canal Rd., Cleveland. Estimated total cost $150,000. T. R. Ridlaw, Hartman Hotel Bldg., Columbus, is architect.

Ice Manufacturing Equipment — Owen Sound Arena, Ltd., R. Patterson, Pres., Owen Sound, Ont., interested in prices on complete equipment for the manufacture of artificial ice for proposed new arena. Estimated cost $50,000.

Ice House—Service Ice Co., M. St. Pierre, Pres., 702 Pleasant St., Fall River, Mass., plans the construction of an ice house. Estimated cost $50,000. Engineer not selected.

Ice Manufacturing Plant — Hain Bros., Meadow St., Norwalk, Conn., will build a 1 story, 55 x 150 ft. ice manufacturing plant at Meadow St. Ext. Estimated cost to exceed $40,000. H. E. Koerner, 83 Fairfield Ave., Norwalk, is engineer. Work will be done by separate contracts.

Ice Plant—Central Power & Light Co., Frost Bldg., San Antonio, Tex., is having preliminary surveys made for the construction of a new ice plant at Devils River Highway. Estimated cost $60,000. Private plans.

Ice Plant—Continental Oil Co., Continental Oil Bldg., Denver, Colo., and Dry Ice Corp. of America, 52 Vanderbilt Ave., New York, N. Y., plan the construction of a 60 ton dry ice plant at Walden.

Ice Plant—Parle Ice & Coal Co., Kirkland St., Dover, N. H., will soon award contract for addition and alterations to ice plant. Estimated cost $40,000. A. W. K. Billings, Jr., 80 Boylston St., Boston, Mass., is architect.

Refrigeration Plant—Moore Grocery Co., Lufkin, Tex., plans the construction of a refrigeration plant including six cold storage rooms, etc. Estimated cost $15,000.

Creamery—Hagersville Co-operative Creamery Co., R. Stewart, Gen. Mgr., Hagersville, Ont., is having plans prepared for the construction of a creamery. Complete equipment including cooling equipmet, etc., will be required.

Creamery Building—R. W. Jessup, 5430 Phyllis and Glendale Sts., Glendale, Calif., awarded contract for the construction of a 1 story, 34 x 36 ft. creamery building at 5430 Phyllis Ave. to J. L. Taylor Co. Inc., 412 West Colorado St., Glendale.

Dairy Plant—Clarks Dairy Ltd, Bronson Ave., Ottawa, Ont., is receiving bids for the construction of a dairy plant on Bronson Ave. Estimated cost $50,000. F. F. Saunders, 116 Concord Ave., Toronto, Ont., is architect.

Dairy Plant—Isaly Dairy Co., C. Isaly, Pres., 1033 Mahoning Ave., Youngstown, O., will soon award contract for a 3 story, 120 x 120 ft. dairy plant. Estimated cost $200,000. McCormick Co., Inc., 121 South Negley Ave., Pittsburgh, is architect.

Dairy Plant—W. H. Roberts, 118 South Delaware St., Indianapolis, Ind., awarded contract for the construction of a dairy plant on Millersville Rd. to A. A. Smock, 3725 North Delaware St., Indianapolis. Estimated cost $44,000.

Dairy Plant—Titusville Dairy Products Co., H. Rabild, Pres. and Mgr., South Washington St., Titusville, Pa., plans the construction of a 1 and 2 story dairy plant on S. Washington St. Braziell & Anderson, 209 4th Ave., Pittsburgh, are architects.

Dairy Plant — G. Willaredt, 411 23rd St., West New York, N. J., Archt., will receive bids about Aug. 15 for the construction of a 2 story, 28 x 155 ft. addition to dairy plant at 45th St. and New York Ave., Union City, for Consumers Dairy Co., 400 45th St., Union City. Estimated cost $45,000.

Dairy Plant—Willida Dairy Co., 744 North Allen St., South Bend, Ind., is having plans prepared for the construction of a 64 x 208 ft. plant on Louise St. Estimated cost $47,000. W. W. Schneider, South Bend, is architect.

Dairy Husbandry Building — Blacksburg School, Blacksburg, Va., awarded contract for the construction of a dairy husbandry building to Northeastern Construction Co., Greensboro. $150,000.

Dairy and Ice Cream Plant—Clover Farm Dairy Co., 75 Walnut St., Memphis, Tenn., had plans prepared for the construction of a dairy and ice cream plant at Beale Ave. and Manassas St. Estimated cost $55,000. T. H. Allen, McCall St., Memphis, is engineer.

Ice Cream Factory—Malden Ice Cream Co., 84 Exchange St., Malden, Mass., is having preliminary plans prepared for additions and alterations to ice cream factory. Estimated cost $40,000 including equipment. A. W. K. Billings, 80 Boylston St., Boston, is architect.

Milk Plant—J. B. Nichols, Chickasha, Okla., is having preliminary plans prepared for the construction of a milk condensing plant. Estimated cost $100,000. Private plans.

Milk Distribution Plant and Pasteurizing Plant—Roberts & Roberts, 82 West Washington St., Chicago, Ill., Archts., will receive bids until Aug. 6 for the construction of a 1 story, 78 x 344 ft. milk distribution plant on Vincennes Ave., Blue Island for Borden Farm Products Co., 326 West Madison St., Chicago, Ill. Owner also awarded masonry and carpentry contracts for a 2 and 3 story, 152 x 266 ft. pasteurizing plant at 320 West 70th Pl. Estimated cost $150,000 and $380,000 respectively.

Milk Distribution Plant—Sheffield Farms Co., Inc., 524 West 57th St., New York, N. Y., awarded contract for a 2 story, 105 x 115 ft. milk distribution plant at Howe and Delaware Aves., Passaic, N. J., to J. J. O'Leary Co., 125 Prospect St., Passaic. Estimated cost $150,000. Will also soon award contract for addition and alterations to plant at Teaneck. $75,000. F. A. Rooke, 12 East 41st St., New York, N. Y., is architect.

Food Products Plant—Jell-X-Cell Corp., c/o Foltz & Co., 510 North Dearborn St., Chicago, Ill., Archts., has work under way on the construction of a plant for the manufacture of a vegetable compound food product at 74th St. and Woodlawn Ave. Estimated cost $100,000.

Grocery Plant—Aarat Grocery Co., Inc., Albany St., Cambridge, Mass., plans addition and alterations to plant on Albany St. Estimated cost $40,000. J. Bilzerian, 339 Union St., Worcester, Mass., is architect.

Grocery Plant—Helwig & Leitch Corp., 1533 Gorsuch Ave., Baltimore, Md., will soon award contract for addition and alterations to factory at 1640-44 Gorsuch Ave. Ownes & Sisco, Continental Bldg., Baltimore, are architects.

Grocery Warehouse—Utah Wholesale Grocery Co., 275 West Second St., Salt Lake City, Utah, awarded contract for the construction of a 2 story warehouse to Ryberg-Sorenson Co., Salt Lake City. Estimated cost $100,000.

Terminal Building — Buffalo Terminal Co., Buffalo, N. Y., will soon award contract for the construction of a terminal building to include refrigeration warehouses, etc. $500,000. Total estimated cost $5,000,000. G. S. Rider Co., Marshall Bldg., Cleveland, O., is architect and engineer.

Tea Factory—Jewel Tea Co., 917 Irwin Ave., Pittsburgh, Pa., will soon award contract for the construction of a 2 story, 70 x 100 ft. warehouse in connection with tea factory at Forbes St. and McDevitt Pl. Lake & Davidson, Negley Bldg., Pittsburgh, are architects.

Feed Mill Addition—Ralston Purina Co., 835 South 8th St., St. Louis, Mo., awarded contract for an 8 story, 86 x 125 and 34 x 58 ft. addition to feed mill at 827 South 8th St. to Jones-Hettelsater Construction Co., 600 Mutual Bldg., Kansas City, Mo. Estimated cost $300,000.

Flour Products Plant—W. P. Gross Tanner & Co., Bank St., St. George, S. I., N. Y., are having sketches made for a 7 story warehouse in connection with flour products plant at West Brighton. Estimated cost $150,000. R. W. Cory, 30 Church St., New York, N. Y., is architect.

Grain Elevator—Cargill Elevator Co., 1100 First National Soo Line Bldg., Minneapolis, Minn., awarded contract for the construction of a grain elevator, 2,000,000 bu. capacity to James Stewart & Co., 343 South Dearborn St., Chicago, Ill.

Grain Elevator Addition—Chicago, Burlington & Quincy R.R., 547 West Jackson Blvd., Chicago, Ill., awarded contract for addition to grain elevator, 200,000 bu. capacity at 4th St. and 28th Ave., Council Bluffs, Ia., to Burrell Engineering & Construction Co., 513 West Jackson Blvd., Chicago. Estimated cost $125,000. A. W. Newton is chief engineer.

Grain Elevator—Farmers Union Terminal Association, M. W. Thatcher, Mgr., Minnesota Bldg., St. Paul, Minn., will build a grain elevator 1,000,000 bu. at Wahpeton, N. D.; also grain elevator, 500,000 bu. capacity at max. Estimated cost $100,000 and $50,000 respectively. Private plans. Work will be done by day labor.

Grain Elevator—Montana Flour Co., Great Falls, Montana, awarded contract for the construction of twelve concrete bins, 28 ft. in diameter and 100 ft. high to Alloway & George, Hutton Bldg., Spokane, Wash. Estimated cost $75,000.

Grain Elevator—Nebraska-Iowa Grain Co., 421 Grain Exchange Bldg., Omaha, Neb., has work under way on the construction of a grain elevator at Gibson. Estimated cost $400,000. Burrell Engineering & Construction Co., 513 West Jackson Blvd., Chicago, Ill., is engineer.

Grain Elevator—Peavey Duluth Terminal Co., Garfield Ave., Duluth, Minn., awarded contract for the construction of a grain elevator, 2,000,000 bu. capacity to Barnett & Record Co., 418 Lyceum Bldg., Duluth. Estimated cost $425,000.

Grain Elevator Addition—N. M. Patterson & Co., Fort William, Ont., has work under way on addition to grain elevator, 1,600,000 bu. capacity. Estimated cost $250,000. Fegles Construction Co., 523 South 7th St., Minneapolis, Minn., is contractor.

Grain Elevator Addition—Vancouver Harbor Commissioners, Dunlevy Ave., Vancouver, B. C., awarded contract for addition to grain elevator, 1,820,000 bu. capacity to Carter-Halls-Aldinger Co., 510 Hastings St. W., Vancouver. Estimated cost $380,000.

Seed Plant—Mitchellhill Seed Co., St. Joseph, Mo., awarded contract for the construction of a 5 story, 50 x 83 ft. seed plant at Sylvanie and Second Sts. to Peterson Construction Co., 620 Pioneer Trust Bldg., Kansas City.

Grain Storage Bins — International Milling Co., 1100 Flour Exchange, Minneapolis, Minn., has work under way on the construction of eight storage bins each 18 ft. in diameter and 110 ft. high supported on a mattress of wood piles and concrete slab, 92 x 35 ft., to Burrell Engineering & Construction Co., 513 West Jackson Blvd., Chicago, Ill. Estimated cost $50,000. Contract for piping let to E. A. Whitney & Son, 116 City Bank Bldg., Kansas City, Mo.

Packing Plant—A. Glauser, 2130 Market St., St. Louis, Mo., will soon receive bids for the construction of a 1 story packing plant, including 52 x 129 ft. cooler building, 68 x 150 ft. warehouse, etc. at 704 South Spring Ave. Estimated cost $75,000. Aegerter & Bailey, 1904 Railway Exchange Bldg., St. Louis, are architects.

Packing and Processing Plant — Walnut Growers Association, Live Oak, Calif., awarded contract for the construction of a 1 story packing and processing plant to J. J. Cavanagh, Stockton, Calif. $23,000.

Packing Plant—Glendora Lemon Growers Association, Glendora, Calif., is having plans prepared for the construction of a 2 story, 90 x 163 ft. packing plant. Estimated cost $45,000. W. W. Ache, 1616 4th Ave., is architect.

Packing Plant (Citrus)—Lake Placid Citrus Growers Association, Lake Placid, Fla., will soon start work on a packing plant. Estimated cost $70,000.

Packing Plant (Citrus)—Texas Citrus Fruit Growers Exchange, San Benito, Tex., plans the construction of a citrus packing plant at Brownsville. Estimated cost $100,000. H. Ewing, San Benito, is architect and engineer. Equipment will be required.

Packing Plant (Vegetable and Citrus)—L. E. Snaveley, Weslaco, Tex., will build a 2 story, 80 x 120 ft. vegetable and citrus packing plant. Estimated cost $35,000. Private plans. Work will be done by day labor.

Packing Plant Addition (Meat) — American Packing Co., 3842 Garfield Ave., St. Louis, Mo. will build a 3 story, 50 x 78 ft. addition to meat packing plant. Koerner Engineering Co., 1601 Syndicate Trust Bldg., St. Louis, is engineer.

Packing Plant (Meat)—Continental Packing Co., 1217 Park Ave., San Jose, Calif., is receiving bids for the construction of a 1 and 2 story meat packing plant, also reduction plant on Berryessa Rd. Estimated cost $50,000.

Packing Plant (Meat) Canning Plant, Etc.—State Prison Commission, c/o W. A. Paddock, Chn., Second National Bank Bldg., Houston, Tex., plans convict farm improvements to include meat packing plant, canning plant, refrigeration plant, warehouse, etc. at Sugarland. Estimated total cost $240,000. L. D. Royer, 911 Smith-Young Tower, San Antonio, is engineer.

Stock Yard Building — Pennsylvania R.R., Broad St. Station, Philadelphia, Pa., awarded contract for the construction of a stock yard building on Herrs Island to J. F. Casey Co., Freeport Rd., Aspinwall. Estimated cost $50,000.